



Landbird Monitoring in the Sonoran Desert Network

2012 Annual Report

Natural Resource Technical Report NPS/SODN/NRTR—2013/744



ON THE COVER

Hooded Oriole (*Icterus cucullatus*). Photo by Moez Ali.

Landbird Monitoring in the Sonoran Desert Network

2012 Annual Report

Natural Resource Technical Report NPS/SODN/NRTR—2013/744

Authors

Moez Ali
Rocky Mountain Bird Observatory
230 Cherry Street, Suite 150
Fort Collins, Colorado 80521

Kristen Beaupré
National Park Service
Sonoran Desert Network
7660 E. Broadway Blvd, Suite 303
Tucson, Arizona 85710

Patricia Valentine-Darby
University of West Florida
Department of Biology
11000 University Parkway
Pensacola, Florida 32514

Chris White
Rocky Mountain Bird Observatory
230 Cherry Street, Suite 150
Fort Collins, Colorado 80521

Project Contact

Robert E. Bennetts
National Park Service
Southern Plains Network
Capulin Volcano National Monument
PO Box 40
Des Moines, New Mexico 88418

May 2013

U.S. Department of the Interior
National Park Service
Natural Resource Stewardship and Science
Fort Collins, Colorado

The National Park Service, Natural Resource Stewardship and Science office in Fort Collins, Colorado, publishes a range of reports that address natural resource topics. These reports are of interest and applicability to a broad audience in the National Park Service and others in natural resource management, including scientists, conservation and environmental constituencies, and the public.

The Natural Resource Technical Report Series is used to disseminate results of scientific studies in the physical, biological, and social sciences for both the advancement of science and the achievement of the National Park Service mission. The series provides contributors with a forum for displaying comprehensive data that are often deleted from journals because of page limitations.

All manuscripts in the series receive the appropriate level of peer review to ensure that the information is scientifically credible, technically accurate, appropriately written for the intended audience, and designed and published in a professional manner. Data in this report were collected and analyzed using methods based on established, peer-reviewed protocols and were analyzed and interpreted within the guidelines of the protocols.

Views, statements, findings, conclusions, recommendations, and data in this report do not necessarily reflect views and policies of the National Park Service, U.S. Department of the Interior. Mention of trade names or commercial products does not constitute endorsement or recommendation for use by the U.S. Government.

This report is available from the Sonoran Desert Network website, <http://science.nature.nps.gov/im/units/SODN>, as well as at the Natural Resource Publications Management web site, <http://www.nature.nps.gov/publications/NRPM>.

Please cite this publication as:

Ali, M., K. Beaupré, P. Valentine-Darby, and C. White. 2013. Landbird monitoring in the Sonoran Desert Network: 2012 annual report. Natural Resource Technical Report NPS/SODN/NRTR—2013/744. National Park Service, Fort Collins, Colorado.

Contents

Acronyms	xi
Executive Summary	xiii
1 Introduction	1
1.1 Background	1
1.2 Program Goals and Objectives	2
2 Methods	3
2.1 Methods.....	3
2.2 Bird Surveys	4
2.3 Additional Monitoring to Augment Bird Sampling	5
2.4 Reporting.....	6
2.5 Accessing the Data.....	6
3 Results and Discussion	7
3.1 Casa Grande Ruins National Monument	22
3.2 Chiricahua National Monument	25
3.3 Coronado National Memorial	30
3.4 Fort Bowie National Historic Site	34
3.5 Gila Cliff Dwellings National Monument	38
3.6 Montezuma Castle National Monument.....	42
3.7 Organ Pipe Cactus National Monument.....	49
3.8 Saguaro National Park.....	53
3.9 Tonto National Monument	61
3.10 Tumacácori National Historical Park	65
3.11 Tuzigoot National Monument	69
4 Literature Cited	73

Figures

- Figure 2.1.2. Dates when sampling was conducted in SODN parks, 2012..... 4
- Figure 2.2. Distance sampling works by estimating a detection profile (graph) as a function of distance from which either individual or groups of birds are observed from the transect. 5
- Figure 3.1.1. Point locations targeted for annual sampling at Casa Grande Ruins NM. 23
- Figure 3.2.1. Point locations targeted for annual sampling at Chiricahua NM. 26
- Figure 3.3.1. Point locations targeted for annual sampling at Coronado NMem. 31
- Figure 3.4.1. Point locations targeted for annual sampling at Fort Bowie NHS. 35
- Figure 3.5.1. Point locations targeted for annual sampling at Gila Cliff Dwellings NM. 39
- Figure 3.6.1-1. Point locations targeted for annual sampling at Montezuma Castle NM, Castle Unit. .43
- Figure 3.6.1-2. Point locations targeted for annual sampling at Montezuma Castle NM, Well Unit. 47
- Figure 3.7.1. Point locations targeted for annual sampling at Organ Pipe Cactus NM. 50
- Figure 3.8.1-1. Point locations targeted for annual sampling at Saguaro NP, Rincon Mountain District (SAGE)..... 55
- Figure 3.8.1-2. Point locations targeted for annual sampling at Saguaro NP, Tucson Mountain District (SAGW). 59
- Figure 3.9.1. Point locations targeted for annual sampling at Tonto NM. 62
- Figure 3.10.1. Point locations targeted for annual sampling at Tumacácori NHP. 66
- Figure 3.11.1. Point locations targeted for annual sampling at Tuzigoot NM. 70

Tables

Table 1.1-1. Parks in the Sonoran Desert Inventory & Monitoring Network (SODN)	1
Table 2.1.1-1. Habitat classes and major types by park	3
Table 2.1.1-2. Number of transects or grids of each habitat class surveyed in each SODN park unit, 2012	3
Table 3-1. Numbers of point counts (# of counts from a given point during a given sampling occasion) and individual birds counted in each habitat class at each SODN park, 2012	7
Table 3-2. Number of species observed in each habitat class at each park, 2012	7
Table 3-3. Total number of birds observed of each species during surveys in all SODN parks, 2012	8
Table 3-4. Parks where each species was observed, April through June 2012	11
Table 3.1.1. Habitat type, number of points, and sampling dates for each transect or grid at Casa Grande Ruins NM, 2012	22
Table 3.1.2. Number of birds counted of each species in desert scrub habitat, Casa Grande Ruins NM, 2012	24
Table 3.2.1. Habitat type, number of points, and sampling dates for each transect or grid, Chiricahua NM, 2012	25
Table 3.2.2. Number of birds counted of each species in each habitat type, Chiricahua NM, 2012	27
Table 3.3.1. Habitat type, number of points, and sampling dates for each transect or grid, Coronado NMem, 2012	30
Table 3.3.2. Number of birds counted of each species in each habitat type, Coronado NMem, 2012	32
Table 3.4.1. Habitat type, number of points, and sampling dates for each transect or grid, Fort Bowie NHS, 2012	34
Table 3.4.2. Number of birds counted of each species in each habitat type, Fort Bowie NHS, 2012	36
Table 3.5.1. Habitat type, number of points, and sampling dates for each transect or grid, Gila Cliff Dwellings NM, 2012	38
Table 3.5.2. Number of birds counted of each species in each habitat type, Gila Cliff Dwellings NM, 2012	40
Table 3.6.1. Habitat type, number of points, and sampling dates for each transect or grid, Montezuma Castle NM, 2012	42
Table 3.6.2-1. Number of birds counted of each species in each habitat type, Montezuma Castle NM– Castle Unit, 2012	44
Table 3.6.2-2. Number of birds counted in riparian habitat, Montezuma Castle NM–Well Unit, 2012	48
Table 3.7.1. Habitat type, number of points, and sampling dates for each transect or grid, Organ Pipe Cactus NM, 2012	49
Table 3.7.2. Number of birds counted of each species in each habitat type, Organ Pipe Cactus NM, 2012	51
Table 3.8.1. Habitat type, number of points, and sampling dates for each transect or grid, Saguaro NP, 2012	54
Table 3.8.2-1. Number of birds counted of each species in each habitat type, Saguaro NP–Rincon Mountain District (SAGE), 2012	56
Table 3.8.2-2. Number of birds counted of each species in desert scrub habitat, Saguaro NP–Tucson Mountain District (SAGW), 2012	60
Table 3.9.1. Habitat type, number of points, and sampling dates for each transect or grid, Tonto NM, 2012	61
Table 3.9.2. Number of birds counted of each species in each habitat type, Tonto NM, 2012	63

Table 3.10.1. Habitat type, number of points, and sampling dates for each transect or grid, Tumacácori NHP, 2012	65
Table 3.10.2. Number of birds counted of each species in riparian habitat, Tumacácori NHP, 2012	67
Table 3.11.1. Habitat type, number of points, and sampling dates for each transect or grid, Tuzigoot NM, 2012	69
Table 3.11.2. Number of birds counted of each species in each habitat type, Tuzigoot NM, 2012	71

Photos

One Rufous Hummingbird (<i>Selasphorus rufus</i>) was observed in 2012 on surveys, but the species has previously been recorded at every park in the network except for Casa Grande Ruins NM.	10
Three Greater Roadrunners (<i>Geococcyx californianus</i>) were observed at Casa Grande Ruins NM in 2012.	22
Mexican Jay (<i>Aphelocoma ultramarina</i>) accounted for 9% of all birds counted at Chiricahua NM in 2012.	25
Lark Sparrow (<i>Chondestes grammacus</i>) was one of the most commonly counted species at Coronado NMem in 2012.	30
Hepatic Tanager (<i>Piranga flava</i>) was recorded at the Historic Site for the first time in 2012.	34
One Great Horned Owl (<i>Bubo virginianus</i>) was observed at Gila Cliff Dwellings NM in 2012.	38
Phainopepla (<i>Phainopepla nitens</i>) had a relatively high number of individuals counted at the Castle Unit in 2012.	42
Summer Tanager (<i>Piranga rubra</i>) was counted in both desert scrub and riparian habitat at both park units in 2012.	46
Curve-billed Thrasher (<i>Toxostoma curvirostre</i>), a desert resident, was observed in relatively high numbers in 2012 (seventh species on the list).	49
Gambel's Quail (<i>Callipepla gambelii</i>) were recorded on desert scrub, woodland, and riparian transects at Saguaro NP in 2012.	53
One Loggerhead Shrike (<i>Lanius ludovicianus</i>) was observed in desert scrub habitat at the National Monument in 2012.	61
Northern Harrier (<i>Circus cyaneus</i>) was detected at the park for the first time in 2012.	65
Black-headed Grosbeak (<i>Pheucticus melanocephalus</i>) was observed at Tumacácori NHP, as well as seven other park units, in 2012.	68
Red-winged Blackbird (<i>Dendroica petechia</i>) was a common species at Tuzigoot NM in 2012.	69

Acronyms

CAGR	Casa Grande Ruins National Monument
CHIR	Chiricahua National Monument
CORO	Coronado National Memorial
FOBO	Fort Bowie National Historic Site
GICL	Gila Cliff Dwellings National Monument
MOCA	Montezuma Castle National Monument
NHS	National Historic Site
NHP	National Historical Park
NM	National Monument
NMem	National Memorial
NP	National Park
NPS	National Park Service
ORPI	Organ Pipe Cactus National Monument
RMBO	Rocky Mountain Bird Observatory
SAGE	Saguaro National Park–Rincon Mountain District
SAGU	Saguaro National Park
SAGW	Saguaro National Park–Tucson Mountain District
SODN	Sonoran Desert Network
TONT	Tonto National Monument
TUMA	Tumacácori National Historical Park
TUZI	Tuzigoot National Monument

Executive Summary

In 2012, landbirds were surveyed within all 11 of the Sonoran Desert Network (SODN) parks. Sample points were located along a transect (in most cases) or a grid. A total of 46 transects or grids was surveyed in 2012. Survey efforts were focused on the breeding season, when increased territorial behavior by songbirds results in higher detection rates and greater sampling efficiency. The window of primary breeding and, therefore, sampling was from April into June, with adjustments made for individual park visits based on latitude and elevation. We used point-transect surveys to estimate and monitor landbird population parameters. Surveys were conducted twice for each transect or grid to facilitate estimates of occupancy, which rely on an encounter-history matrix derived from repeated visits, rather than a detection function to account for detectability.

We conducted a total of 613 point counts (the number of counts from a given point during a given sampling occasion) on 46 transects or grids. Of these, we conducted 451 point counts in upland habitat and 162 point counts in riparian habitat. We recorded a total of 11,125 individual birds (including unidentified birds) of 183 species during our point counts, with one additional bird counted as a flyover. The number and species of birds varied widely among the parks surveyed. Saguaro National Park (NP) had the highest number of birds counted ($n = 3,178$), as well as the greatest number of point counts. Coronado National Memorial (NMem) had the lowest number of birds counted ($n = 451$). We observed the greatest number of species at Saguaro NP ($n = 111$) and the fewest at Casa Grande Ruins National Monument (NM) ($n = 40$). Mourning Dove had the greatest number of individuals counted within the SODN in 2012 ($n = 703$), followed by Gila Woodpecker ($n = 675$), and Ash-throated Flycatcher ($n = 479$). More than 40 species were observed at only one of the 11 parks surveyed; four species (Ash-throated Flycatcher, Common Raven, House Finch, and Mourning Dove) were observed at all 11 parks surveyed; and numerous species were observed at two or more parks. New species, previously unverified in a given park, were recorded at five parks: Cassin's Vireo at Chiricahua NM; Hepatic Tanager at Fort Bowie National Historic Site (NHS); American Goldfinch, Pine Siskin, and Ruby-crowned Kinglet at Gila Cliff Dwellings NM; Hermit Warbler at Montezuma Castle NM; and Belted Kingfisher, Northern Harrier, Spotted Towhee, and Short-tailed Hawk (incidental detection) at Tumacácori NHP.

The Rocky Mountain Bird Observatory (RMBO), our primary cooperator for this project, collects and manages the network's bird monitoring data. Other networks using RMBO also use this data management service and have found it to be efficient and effective. This enables SODN data to be in the same database as those of several other networks and organizations, which in turn allows for a more comprehensive regional assessment. To view interactive maps showing survey and detection locations, as well as species counts and survey effort, visit RMBO's Avian Data Center at <http://rmbo.org/v3/avian/Home>.

1 Introduction

1.1 Background

The mission of the National Park Service (NPS) is to manage park resources “unimpaired for future generations.” Protecting and managing some of our nation’s most significant natural resources requires basic knowledge of the condition of ecosystems and species that occur in national parks. In order to better meet this mission, the Inventory & Monitoring (I&M) Program was established to determine status and trends in ecological resources (NPS 1992). Established in 2001, the Sonoran Desert Inventory & Monitoring Network (SODN) includes 11 parks in southern Arizona and New Mexico (Table 1.1-1). Collectively, these parks are representative of most of the ecological communities present within the Sonoran Desert and Apache Highlands Ecoregions (NPS 2005).

Monitoring changes in landbird population and community parameters can be an important element of a comprehensive, long-term monitoring program, such as that being implemented for the SODN parks. Landbirds are a conspicuous component of many ecosystems, have high body temperatures and rapid metabolisms, and occupy high trophic levels. As such, changes in landbird populations may be indicators of changes in the biotic or abiotic components of the environment upon which they depend (Canterbury et al. 2000; Bryce et al. 2002). Relative to other vertebrates, landbirds are also highly detectable and can be efficiently surveyed with the use of numerous standardized methods (Bibby et al. 2000; Buckland et al. 2001).

Birds select habitat based on the presence of behavioral cues triggered by the environment (Hutto 1985; Alcock 2005). In some environments, however, especially those that vary unpredictably, habitat may not be saturated and changes in resources may not always be tracked by changes in animal populations (Wiens 1985). In these situations, relating changes in bird populations to environmental features can be complex, especially when confounded by time lags that are characteristic of site-tenacious bird species. Additional complications occur if birds respond more sensitively to environmental change than we can detect, and when cyclical environmental changes result in erratic changes in population size that are ultimately inconsequential. However, the utility of monitoring landbirds is strengthened by concurrent monitoring of a broad suite of environmental parameters (Dale and Beyeler 2001) that may assist with elucidating changes in the bird community to other environmental factors. Such a broad-based approach is now being undertaken by the SODN (NPS 2008) and other broad-based monitoring approaches (e.g., Ringold et al. 1996; Stevens and Gold 2003; Barrows et al. 2005).

Perhaps the most compelling reason to monitor landbird communities is that birds themselves are inherently valuable. The high aesthetic and spiritual values that humans place on native wildlife is acknowledged in the agency’s Organic Act: “to conserve . . . the wild life therein . . . unimpaired for the enjoyment of future generations.” Bird-

Table 1.1-1. Parks in the Sonoran Desert Inventory & Monitoring Network (SODN)

Park	Park Acronym	Area (Acres)	Area (Hectares)
Casa Grande Ruins National Monument (NM)	CAGR	472	191
Chiricahua National Monument (NM)	CHIR	11,984	4,852
Coronado National Memorial (NMem)	CORO	4,750	1,923
Fort Bowie National Historic Site (NHS)	FOBO	1,000	404
Gila Cliff Dwellings National Monument (NM)	GICL	533	216
Montezuma Castle National Monument (NM)	MOCA	858	347
Organ Pipe Cactus National Monument (NM)	ORPI	330,688	133,882
Saguaro National Park (NP)	SAGU	102,011	41,300
Tonto National Monument (NM)	TONT	1,120	453
Tumacácori National Historical Park (NHP)	TUMA	356	144
Tuzigoot National Monument (NM)	TUZI	373	149

watching, in particular, is a popular, longstanding recreational pastime in the U.S., and forms the basis of a large and sustainable industry (Seker-cioglu 2002).

The SODN began monitoring birds in spring 2007; This effort is now part of a collaboration among the Southern Plains, Sonoran Desert, and Chihuahuan Desert networks to interpret monitoring information in a more comprehensive manner across the southwestern U.S.

1.2 Program Goals and Objectives

The overall goal of the SODN landbird monitoring program is to detect biologically significant changes in population parameters over time. This collaborative program is intended to maximize the strength of inferences within the context of finite resources. The monitoring design is a multitiered, flexible framework that will enable efficient estimation and monitoring of population parameters, periodic evaluation of assumptions, and the opportunity for adaptation to meet additional needs.

We have selected three primary monitoring objectives, described below, that are complementary and together provide a comprehensive assessment of changing bird populations and communities. Although we have selected these objectives, it is neither practical nor useful to conduct comprehensive analyses for each objective on an annual basis. Instead, we will provide annual basic data summaries and, once every five years, a comprehensive synthesis report that will go into much greater depth, including analyses for all objectives and interpretations in a broader ecological context.

1.2.1 Objective 1: Occupancy

We will estimate the proportion of points occupied for most species in most parks. Occupancy

is a measure of presence or absence of a species in space that indicates changes in the distribution of a species when evaluated across time. Recent advancements in occupancy theory and modeling have provided sound justification of its application in monitoring programs (MacKenzie et al. 2003; Field et al. 2005; MacKenzie et al. 2006).

1.2.2 Objective 2: Bird species richness and composition

We will estimate parameters related to community dynamics, particularly species richness and species composition. Monitoring the richness and composition of native communities of concern, and the changes occurring within and among these communities, provides a valuable complement to population-based parameters. Species richness data are essential to understanding the effects of changing landscapes on native biodiversity. Species composition helps us to understand the effects of management and other changes by assessing which species are or are not responding to changes in the environment.

1.2.3 Objective 3: Density (when feasible)

We will estimate density of the most common species using the point-transect distance-sampling method at fixed points and the Distance program for subsequent analyses (Thomas et al. 2005). Provided that assumptions are reasonably met, distance-sampling methods allow researchers to model a detection function that adjusts for imperfect detectability; the methods are robust and widely accepted for estimating landbird abundance (Buckland et al. 2001). With reasonable effort, we will likely only be able to estimate density annually for the most common species in larger parks.

2 Methods

2.1 Methods

2.1.1 Sampling design

The details of our sampling design and field methods are presented in Powell et al. (2007) and Bennetts et al. (2013, in review). Our intention for monitoring landbirds extends beyond the birds themselves, and includes a broader vision of landbirds as indicators of the ecosystems they inhabit. This dual purpose influences our sampling design, especially in light of our funding and logistical limitations. In some cases, trade-offs have been made to accommodate particular habitat types or park resources that are considered particularly important to a given park.

We stratified most parks by mesic riparian and upland habitat classes, although SODN parks contain a wide range of upland vegetation (and, by extension, bird) communities. The dominant vegetation communities represented by upland areas in SODN parks can be further stratified into three major habitat types: desert scrub, grassland/savanna, and forest and woodland (Table 2.1.1-1).

Table 2.1.1-2. Number of transects or grids of each habitat class surveyed in each SODN park unit, 2012

Park unit	Riparian	Upland
Casa Grande Ruins NM	--	1
Chiricahua NM	--	6
Coronado NMem	--	2
Fort Bowie NHS	1	1
Gila Cliff Dwellings NM	1	1
Montezuma Castle NM– Castle Unit	2	1
Montezuma Castle NM–Well Unit	1	--
Organ Pipe Cactus NM	2	4
Saguaro NP–SAGE	1	11
Saguaro NP–SAGW	--	5
Tonto NM	1	1
Tumacácori NHP	2	--
Tuzigoot NM	2	--

Table 2.1.1-1. Habitat classes and major types by park

Habitat class	Major habitat types	Parks
Upland	Desert scrub	<ul style="list-style-type: none"> • Casa Grande Ruins NM • Montezuma Castle NM • Organ Pipe Cactus NM • Saguaro NP–Tucson Mountain District (SAGW) at <4,000 feet in Saguaro NP–Rincon Mountain District (SAGE) and Tonto NM • Tumacácori NHP • Tuzigoot NM
Upland	Grassland/savanna	<ul style="list-style-type: none"> • Chiricahua NM • Coronado NMem • Fort Bowie NHS
Upland	Forest and Woodland	<ul style="list-style-type: none"> • Chiricahua NM • Coronado NMem • Gila Cliff Dwellings NM • Saguaro NP–SAGE
Riparian	Riparian	<ul style="list-style-type: none"> • Fort Bowie NHS • Gila Cliff Dwellings NM • Montezuma Castle NM–Castle Unit • Montezuma Castle NM–Well Unit • Organ Pipe Cactus NM • Saguaro NP–SAGE • Tonto NM • Tumacácori NHP • Tuzigoot NM

In 2012, we surveyed landbirds within all of the 11 SODN parks. Sample points were located along a transect (in most cases) or a grid. A total of 46 transects or grids were surveyed in 2012 (Table 2.1.1-2). In most parks, we used sites selected with methodology outlined in Powell et al. (2007). Exceptions occurred at Organ Pipe Cactus National Monument (NM) and Saguaro National Park (NP), because of safety concerns related to undocumented immigration and smuggling. Details of these exceptions are presented in Bennetts et al. (2013, in review).

2.1.2 Seasonal timing of surveys

During the breeding season, increased territorial behavior by songbirds results in higher detection rates and greater sampling efficiency. Additionally, occupancy estimates assume that a bird detected is present for the entire period being surveyed (in this case, both survey periods). Thus, our surveys were focused on the primary breeding season in order to account for the greatest number of species in each park, recognizing that some species (e.g., migrants) may not have been adequately surveyed because of this restricted window. Although migrants are certainly an important component of bird communities, their

presence can be highly variable and substantially influenced by external factors. Focusing on the breeding population is expected to provide the most reliable information about changes in bird populations related to changes in condition of SODN parks.

The timing of breeding varies among species and depends on a number of factors, including latitude and elevation. Birds at southern latitudes and lower elevations tend to breed earlier than those at higher latitudes and elevations. Consequently, parks with a wide elevation range (e.g., Saguaro NP) also had a wide range of sampling dates. The window of primary breeding and sampling was from April through June, with adjustments, as described above, for individual park visits based on latitude and elevation (Figure 2.1.2).

2.2 Bird Surveys

We used point-transect surveys to estimate and monitor landbird population parameters (Buckland et al. 2001). The point-transect approach evolved from the variable circular plot approach (Reynolds et al. 1980) and distance sampling of line transects (Burnham et al. 1980). A point-transect is a line transect of zero length (i.e., a point)

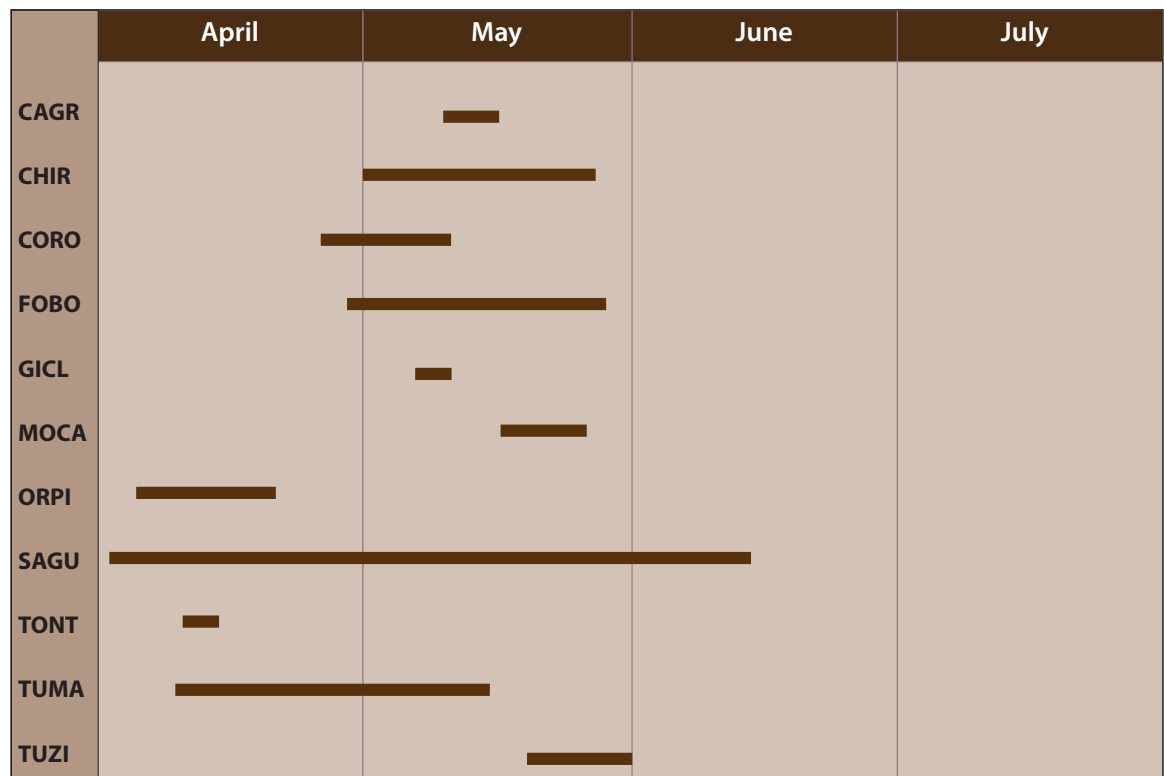


Figure 2.1.2. Dates when sampling was conducted in SODN parks, 2012.

(Buckland et al. 2001). For density estimates, the method involves estimating the linear distance to individual birds while standing for a predetermined period of time at a fixed point in space (Figure 2.2). For groups of birds, we estimated the distance to the group and the number of birds in the group. Estimating the distance to each bird allows the observer to approximate density via a species-specific detection function that accounts for variation in detectability due to surveyor, environmental, or weather-related factors (Buckland et al. 2001; Diefenbach et al. 2003).

All birds detected at a given point were recorded. After counts were completed, observers used a handheld GPS (Global Positioning System) unit to locate successive survey points. While walking between points, observers recorded species previously unconfirmed in a particular park.

Surveys were conducted twice for each transect or grid to facilitate occupancy estimates, which rely on an encounter-history matrix derived from repeated visits, rather than a detection function to account for detectability. Only four of the 46 transects, all at Saguaro NP, were visited once.

We conducted six-minute point-counts at each point along the transect or grid and used a range-finder to measure the linear distance to each bird or group detected. Six-minute counts are consistent with region-wide bird monitoring efforts being conducted by Rocky Mountain Bird Observatory (RMBO) and its partners.

2.3 Additional Monitoring to Augment Bird Sampling

It is well known that landbird populations are particularly influenced by changes in vegetation structure and composition (Holmes and Sherry 2001; Krueper et al. 2003). Considering environmental data, such as vegetation, will allow us to aggregate (i.e., to stratify, post-hoc) survey sites that share similar characteristics. For this purpose, we will use data collected through the network's vegetation monitoring efforts. We will also use other data (e.g., climate) collected by SODN and other organizations as covariates when assessing population trends for birds. Finally, landbird population parameters, coupled with detailed environmental information, can be used to

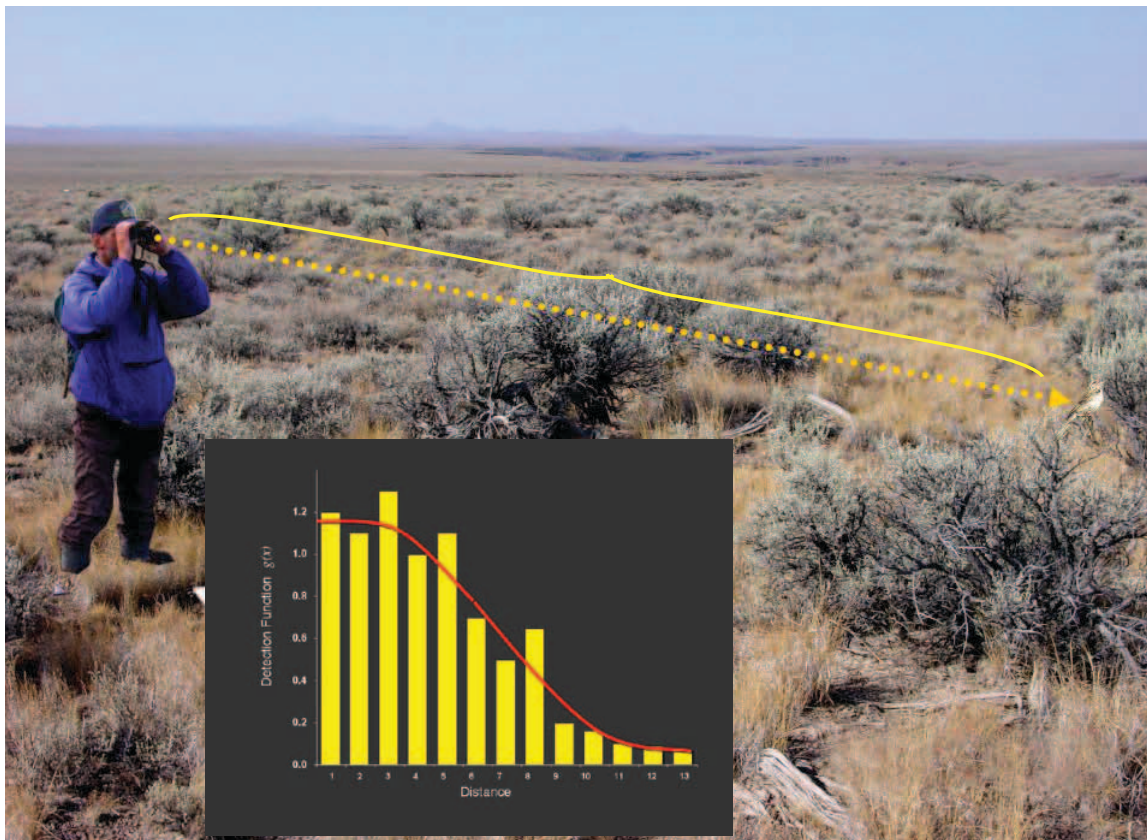


Figure 2.2. Distance sampling works by estimating a detection profile (graph) as a function of distance from which either individual or groups of birds are observed from the transect.

build habitat-association models (e.g., Manley et al. 2004) that can inform conservation efforts and scientific inquiry throughout the region.

2.4 Reporting

The primary monitoring objectives focus on long-term changes and trends, and monitoring must be conducted for a number of years before meaningful estimates related to trends are feasible. Consequently, it is neither practical nor useful to conduct comprehensive analyses for each objective on an annual basis. Instead, we will provide annual basic data summaries and, once every five years, a comprehensive synthesis report that will go into much greater depth, including analyses for all objectives and interpretations in a broader ecological context.

Field methods for estimating all three primary objectives are essentially the same; analyses and evaluation procedures used to estimate trends will differ.

It is neither practical nor useful to conduct comprehensive analyses for each objective on an annual basis. Instead, we will provide annual basic data summaries and, once every five years, a comprehensive synthesis report that will go into much greater depth, including analyses for all objectives and interpretations in a broader ecological context.

2.5 Accessing the Data

RMBO, our primary cooperator for this project, manages the bird monitoring data they collect. Other networks using RMBO also use this service and have found it to be efficient and effective. This enables SODN data to be stored in the same database as that of several other networks and organizations, which in turn allows for a more comprehensive regional assessment. To view interactive maps showing survey and detection locations, as well as species counts and survey effort, visit RMBO's Avian Data Center at <http://rmbo.org/v3/avian/Home.aspx>.

3 Results and Discussion

We conducted a total of 613 point counts (the number of counts from a given point during a given sampling occasion) on 46 transects or grids. Of these, 451 point counts were in upland habitats and 162 point counts were in riparian habitats (Table 3-1). We recorded a total of 11,125 birds (including unidentified birds) of 183 species on our survey points, with one additional bird detected as a flyover.

Saguaro NP had the highest number of birds counted (n = 3,178), as well as the highest number of point counts. Coronado NMem had the lowest number of birds counted (n = 451). We observed the greatest number of species at Saguaro NP (n = 111) and the fewest at Casa Grande Ruins NM (n = 40) (Table 3-2). Although species richness and community composition will be estimated in our synthesis reports, observations suggest that these varied widely among the parks surveyed. The number of individuals or species counted is influenced not only by the number of survey points and visits, but also by the size and diversity of available habitats.

Mourning Dove had the greatest number of individuals counted within the SODN (n = 703), followed by Gila Woodpecker (n = 675), and Ash-throated Flycatcher (n = 479) (Table 3-3). Forty-five species were recorded at only one of

Table 3-2. Number of species observed in each habitat class at each park, 2012

Park	Species detected		
	Upland	Riparian	Total ¹
Casa Grande Ruins NM	40	--	40
Chiricahua NM	92	--	92
Coronado NMem	50	--	50
Fort Bowie NHS	46	55	71
Gila Cliff Dwellings NM	41	50	62
Montezuma Castle NM	52	72	77
Organ Pipe Cactus NM	53	46 ²	63
Saguaro NP	106	37	111
Tonto NM	41	43	50
Tumacácori NHP	--	75	75
Tuzigoot NM	44	48	57
Total¹	159	149	183

¹ Totals do not necessarily equal the sum of the numbers shown for parks or habitat classes, as a single species may have been observed in more than one park or habitat class; #s do not include incidental observations.

² Riparian habitat sampled at ORPI was xeroriparian, thus not directly comparable to more mesic habitats.

the 11 parks surveyed; four species (Ash-throated Flycatcher, Common Raven, House Finch, and Mourning Dove) were recorded at all 11 parks surveyed; and numerous species were recorded at two or more parks (see Table 3-4).

Table 3-1. Numbers of point counts (# of counts from a given point during a given sampling occasion) and individual birds counted in each habitat class at each SODN park, 2012

Park	Upland		Riparian		Total birds counted
	# Point counts	Birds counted	# Point counts	Birds counted	
Casa Grande Ruins NM	18	648	--	--	648
Chiricahua NM	84	1,268	--	--	1,268
Coronado NMem	30	451	--	--	451
Fort Bowie NHS	14	258	16	320	578
Gila Cliff Dwellings NM	12	178	14	272	450
Montezuma Castle NM	16	341	38	808	1,149
Organ Pipe Cactus NM	56	783	28	532	1,315
Saguaro NP	189	2,940	8	238	3,178
Tonto NM	18	353	16	291	644
Tumacácori NHP	--	--	28	765	765
Tuzigoot NM	14	307	14	372	679
Total	451	7,527	162	3,598	11,125

Note: No. of birds counted does not include flyovers. # point counts represents the sum of one or two visits, rather than independent visits.

Table 3-3. Total number of birds observed of each species during surveys in all SODN parks, 2012

Common name	# of birds	Common name	# of birds
Mourning Dove	703	Yellow-breasted Chat	73
Gila Woodpecker	675	Blue-gray Gnatcatcher	72
Ash-throated Flycatcher	479	Summer Tanager	68
Gambel's Quail	446	Yellow Warbler	66
White-winged Dove	443	American Robin	62
House Finch	355	Black-chinned Hummingbird	61
Cactus Wren	307	Western Kingbird	61
Phainopepla	285	Lark Sparrow	59
Bewick's Wren	255	Bell's Vireo	56
Black-throated Sparrow	237	Blue Grosbeak	55
Verdin	203	Canyon Wren	55
Lucy's Warbler	200	Chipping Sparrow	55
Brewer's Sparrow	189	Hepatic Tanager	55
Curve-billed Thrasher	189	Broad-tailed Hummingbird	52
Spotted Towhee	166	Bullock's Oriole	54
Canyon Towhee	147	Abert's Towhee	50
Brown-crested Flycatcher	146	Common Yellowthroat	49
Turkey Vulture	143	Eurasian Collared-Dove	49
Mexican Jay	141	European Starling	48
Scott's Oriole	139	Green-tailed Towhee	47
Great-tailed Grackle	135	Song Sparrow	45
Cassin's Kingbird	134	House Wren	44
Common Raven	132	Wilson's Warbler	44
Red-winged Blackbird	125	Yellow-eyed Junco	44
White-crowned Sparrow	125	Eastern Meadowlark	41
Black-headed Grosbeak	121	Bridled Titmouse	40
Rufous-crowned Sparrow	116	Western Scrub-Jay	40
Rock Pigeon	113	Western Tanager	40
Northern Cardinal	112	Steller's Jay	37
Violet-green Swallow	109	Western Wood-Pewee	34
Northern Mockingbird	106	Dusky-capped Flycatcher	33
White-throated Swift	101	Red-tailed Hawk	32
Lesser Goldfinch	100	Gray Flycatcher	30
Ladder-backed Woodpecker	97	Northern Flicker	30
Rock Wren	93	Warbling Vireo	30
Pyrrhuloxia	91	White-breasted Nuthatch	30
Brown-headed Cowbird	90	Anna's Hummingbird	29
Yellow-rumped Warbler	90	Grace's Warbler	27
Black-tailed Gnatcatcher	88	Rufous-winged Sparrow	27
Black-throated Gray Warbler	83	Acorn Woodpecker	26
Northern Rough-winged Swallow	83	Vermilion Flycatcher	26
Gilded Flicker	76	Pine Siskin	25
Bushtit	73	Hooded Oriole	24

Table 3-3. Total number of birds observed of each species during surveys in all SODN parks, 2012, cont.

Common name	# of birds	Common name	# of birds
Hermit Thrush	23	Peregrine Falcon	7
House Sparrow	22	Botteri's Sparrow	6
Broad-billed Hummingbird	21	Common Black-Hawk	6
Say's Phoebe	21	Gray Vireo	6
Costa's Hummingbird	20	Nashville Warbler	6
Lazuli Bunting	20	Bank Swallow	5
Crissal Thrasher	19	Belted Kingfisher	5
Pygmy Nuthatch	19	Northern Beardless-Tyrannulet	5
Arizona Woodpecker	18	Scaled Quail	5
Cliff Swallow	18	Cassin's Vireo	4
Plumbeous Vireo	18	Cedar Waxwing	4
Great Horned Owl	17	Great Blue Heron	4
Hairy Woodpecker	17	Mallard	4
White-faced Ibis	17	Olive Warbler	4
Band-tailed Pigeon	15	Savannah Sparrow	4
Black-chinned Sparrow	15	Tropical Kingbird	4
Loggerhead Shrike	15	Juniper Titmouse	3
Wild Turkey	15	Marsh Wren	3
Townsend's Warbler	14	Pacific-slope Flycatcher	3
American Kestrel	11	Tree Swallow	3
Barn Swallow	11	Vaux's Swift	3
Gray Hawk	11	Black-crowned Night-Heron	2
Orange-crowned Warbler	11	Bronzed Cowbird	2
Virginia's Warbler	11	Cassin's Sparrow	2
Black Phoebe	10	Great Egret	2
Killdeer	10	Green Heron	2
Purple Martin	10	Hammond's Flycatcher	2
Ruby-crowned Kinglet	10	Lark Bunting	2
Greater Pewee	9	Lesser Nighthawk	2
Greater Roadrunner	9	Magnificent Hummingbird	2
Zone-tailed Hawk	9	Montezuma Quail	2
Cordilleran Flycatcher	8	Red-naped Sapsucker	2
Harris's Hawk	8	Virginia Rail	2
Indigo Bunting	8	Western Bluebird	2
Mexican Chickadee	8	Wood Duck	2
Mountain Chickadee	8	American Coot	1
Painted Redstart	8	American Goldfinch	1
Red-faced Warbler	8	Blue-throated Hummingbird	1
Burrowing Owl	7	Brown Creeper	1
Cooper's Hawk	7	Common Merganser	1
Hutton's Vireo	7	Double-crested Cormorant	1
MacGillivray's Warbler	7	Ferruginous Pygmy-Owl	1

Table 3-3. Total number of birds observed of each species during surveys in all SODN parks, 2012, cont.

Common name	# of birds
Hermit Warbler	1
Horned Lark	1
Lincoln's Sparrow	1
Northern Harrier	1
Northern Pygmy-Owl	1
Olive-sided Flycatcher	1
Prairie Falcon	1
Red-breasted Nuthatch	1
Rufous Hummingbird	1
Swainson's Hawk	1
Thick-billed Kingbird	1
Townsend's Solitaire	1
Western Meadowlark	1
<i>Unidentified birds</i>	<i>267</i>
Total	11,125

Note: Species are listed in rank order from most to least commonly detected. Number of birds is the total number of individuals counted. Because of the potential to confound future comparisons, these values exclude observations of species flying overhead/not using the habitat. Unidentified birds were included in the total number of birds recorded during surveys, but these birds were not included in counts of the number of species detected per park. Incidental sightings (i.e., species identified by our birding team, but not as part of our regular survey) are not included in this table; they are included in individual park species tables only when they were newly recorded for the park.



ROB BENNETTS

One Rufous Hummingbird (*Selasphorus rufus*) was observed in 2012 on surveys, but the species has previously been recorded at every park in the network except for Casa Grande Ruins NM.

Table 3-4. Parks where each species was observed, April through June 2012

Common name	Scientific name	CAGR	CHIR	CORO	FOBO	GICL	MOCA	ORPI	SAGU	TONT	TUMA	TUZI
Abert's Towhee	<i>Melospiza aberti</i>						●	○	●	●	●	●
Acorn Woodpecker	<i>Melanerpes formicivorus</i>		●	●	●	●		○	●			
American Avocet	<i>Recurvirostra americana</i>							○				
American Coot	<i>Fulica americana</i>						○	○				●
American Crow	<i>Corvus brachyrhynchos</i>											○
American Goldfinch	<i>Spinus tristis</i>					●	○	○				
American Kestrel	<i>Falco sparverius</i>	●	●	○	●	○	○	●	○	●	○	●
American Pipit	<i>Anthus rubescens</i>	○			○		○	○			○	○
American Redstart	<i>Setophaga ruticilla</i>		○					○				○
American Robin	<i>Turdus migratorius</i>		●	○	●	●	○	○	●	○	○	○
American White Pelican	<i>Pelecanus erythrorhynchos</i>							○		○		
American Wigeon	<i>Anas americana</i>						○	○				○
Anna's Hummingbird	<i>Calypte anna</i>	●	○	○	●		●	●	●	●	●	○
Arizona Woodpecker	<i>Picoides arizonae</i>		●	●					○			
Ash-throated Flycatcher	<i>Myiarchus cinerascens</i>	●	●	●	●	●	●	●	●	●	●	●
Baird's Sandpiper	<i>Calidris bairdii</i>						○	○				
Bald Eagle	<i>Haliaeetus leucocephalus</i>		○		○	○				○		○
Baltimore Oriole	<i>Icterus galbula</i>										○	
Band-tailed Pigeon	<i>Patagioenas fasciata</i>		●	○		○		○	●			
Bank Swallow	<i>Riparia riparia</i>	●				○	○	○		○	○	●
Barn Owl	<i>Tyto alba</i>	○		○	○	○	○	○	○	○	○	○
Barn Swallow	<i>Hirundo rustica</i>	●	○	○	○	○	●	○	●	○	●	○
Bell's Vireo	<i>Vireo bellii</i>			○	○	○	●	○	●	●	●	○
Belted Kingfisher	<i>Megasceryle alcyon</i>						●		○		●	○
Bendire's Thrasher	<i>Toxostoma bendirei</i>	○			○			○	○			○
Bewick's Wren	<i>Thryomanes bewickii</i>	○	●	●	●	●	●	○	●	●	●	●
Black Phoebe	<i>Sayornis nigricans</i>	○	○	○	○	●	●	○	●	○	○	○
Black Rail	<i>Laterallus jamaicensis</i>							○				
Black Tern	<i>Chlidonias niger</i>							○				○
Black Vulture	<i>Coragyps atratus</i>			○	○			○	○		○	
Black-and-white Warbler	<i>Mniotilta varia</i>							○				
Black-bellied Whistling-Duck	<i>Dendrocygna autumnalis</i>										○	
Black-chinned Hummingbird	<i>Archilochus alexandri</i>	○	●	●	●	○	●	●	●	●	●	●
Black-chinned Sparrow	<i>Spizella atrogularis</i>	○	○	●	○		○	○	●	○		

Table 3-4. Parks where each species was observed, April through June 2012, cont.

Common name	Scientific name	CAGR	CHIR	CORO	FOBO	GICL	MOCA	ORPI	SAGU	TONT	TUMA	TUZI
Black-crowned Night-Heron	<i>Nycticorax nycticorax</i>						o	o			o	●
Black-headed Grosbeak	<i>Pheucticus melanocephalus</i>		●	●	●	●	●	●	●	o	●	o
Black-necked Stilt	<i>Himantopus mexicanus</i>	o						o				
Blackpoll Warbler	<i>Dendroica striata</i>							o				
Black-tailed Gnatcatcher	<i>Polioptila melanura</i>	o	o		o		●	●	●	●	o	o
Black-throated Blue Warbler	<i>Dendroica caerulescens</i>							o				
Black-throated Gray Warbler	<i>Dendroica nigrescens</i>	o	●	●	●	●	o	●	●	o	o	o
Black-throated Green Warbler	<i>Dendroica virens</i>							o				
Black-throated Sparrow	<i>Amphispiza bilineata</i>	o	●	●	●		●	●	●	●	o	●
Blue Grosbeak	<i>Passerina caerulea</i>		●	o	●	o	●	o	o	o	●	●
Blue-gray Gnatcatcher	<i>Polioptila caerulea</i>	o	●	o	●	o	o	●	●	●	●	●
Blue-headed Vireo	<i>Vireo solitarius</i>						o		o			
Blue-throated Hummingbird	<i>Lampornis clemenciae</i>		●	o								
Blue-winged Teal	<i>Anas discors</i>						o	o				o
Bonaparte's Gull	<i>Chroicocephalus philadelphia</i>							o				o
Botteri's Sparrow	<i>Peucaea botterii</i>		o	●	o							
Brewer's Blackbird	<i>Euphagus cyanocephalus</i>	o			o	o	o	o	o	o	o	o
Brewer's Sparrow	<i>Spizella breweri</i>	o	o	●	●	o	o	●	●	●	o	o
Bridled Titmouse	<i>Baeolophus wollweberi</i>		●	o	o	o	●		●		●	o
Broad-billed Hummingbird	<i>Cynanthus latirostris</i>		o	o	●			o	●		●	
Broad-tailed Hummingbird	<i>Selasphorus platycercus</i>		●	●	●	●	●	o	●	●	o	●
Bronzed Cowbird	<i>Molothrus aeneus</i>	o	o	o	●		o	●	o	o	o	o
Brown Creeper	<i>Certhia americana</i>		o	o	o	o	o	o	●		o	o
Brown Pelican	<i>Pelecanus occidentalis</i>							o				
Brown Thrasher	<i>Toxostoma rufum</i>							o				
Brown-crested Flycatcher	<i>Myiarchus tyrannulus</i>	o	●	●	o		●	●	●	o	●	●
Brown-headed Cowbird	<i>Molothrus ater</i>	o	●	●	●	o	●	o	●	o	●	●
Buff-breasted Flycatcher	<i>Empidonax fulvifrons</i>		o						o			
Buff-collared Nightjar	<i>Caprimulgus ridgwayi</i>							o				
Bufflehead	<i>Bucephala albeola</i>						o	o				o
Bullock's Oriole	<i>Icterus bullockii</i>	●	●	●	●	o	●	●	●	●	●	●

● = species detected in 2012 survey

●¹ = species detected in 2012 incidental to the survey, and newly recorded for the park

o = species not detected in 2012 survey, but known to occur in the park, including species that migrate through or winter in the park

Table 3-4. Parks where each species was observed, April through June 2012, cont.

Common name	Scientific name	CAGR	CHIR	CORO	FOBO	GICL	MOCA	ORPI	SAGU	TONT	TUMA	TUZI
Burrowing Owl	<i>Athene cunicularia</i>	●						○				
Bushtit	<i>Psaltriparus minimus</i>		●	●	●	●	●	○	●	○	○	○
Cactus Wren	<i>Campylorhynchus brunneicapillus</i>	○	●	●	●		○	●	●	●	○	○
California Gull	<i>Larus californicus</i>							○				○
Calliope Hummingbird	<i>Stellula calliope</i>		○	○	○	○	○	○	○		○	○
Canada Goose	<i>Branta canadensis</i>						○	○				○
Canvasback	<i>Aythya valisineria</i>						○	○				○
Canyon Towhee	<i>Melospiza fusca</i>	○	●	●	●	●	●	●	●	●	○	○
Canyon Wren	<i>Catherpes mexicanus</i>		●	●	●	●	●	○	●	●		○
Cassin's Finch	<i>Carpodacus cassinii</i>		○	○	○		○		○	○		
Cassin's Kingbird	<i>Tyrannus vociferans</i>	○	●	●	●	●	●	●	●	○	●	●
Cassin's Sparrow	<i>Peucaea cassinii</i>		○	○	○				●		●	
Cassin's Vireo	<i>Vireo cassinii</i>		●	○	●				○	○	○	
Cattle Egret	<i>Bubulcus ibis</i>						○	○				○
Cedar Waxwing	<i>Bombus cedrorum</i>		○	○	○		○	○	○	○	●	○
Chestnut-collared Longspur	<i>Calcarius ornatus</i>			○								
Chihuahuan Raven	<i>Corvus cryptoleucus</i>		○	○	○						○	
Chipping Sparrow	<i>Spizella passerina</i>	○	●	●	●	●	●	●	●	○	●	○
Chukar	<i>Alectoris chukar</i>									○		
Cinnamon Teal	<i>Anas cyanoptera</i>						○	○				○
Clapper Rail	<i>Rallus longirostris</i>											○
Clark's Nutcracker	<i>Nucifraga columbiana</i>		○			○		○	○			
Clay-colored Sparrow	<i>Spizella pallida</i>							○				
Cliff Swallow	<i>Petrochelidon pyrrhonota</i>	●	○		○	○	●	○	○	○	●	○
Common Black-Hawk	<i>Buteogallus anthracinus</i>		○		○	○	●	○	○		○	○
Common Goldeneye	<i>Bucephala clangula</i>							○				○
Common Ground-Dove	<i>Columbina passerina</i>	○	○	○	○			○	○	○	○	
Common Loon	<i>Gavia immer</i>						○	○				
Common Merganser	<i>Mergus merganser</i>					●	○	○				○
Common Moorhen	<i>Gallinula chloropus</i>							○				○
Common Nighthawk	<i>Chordeiles minor</i>		○	○	○	○	○		○			○
Common Poorwill	<i>Phalaenoptilus nuttallii</i>	○	○	○	○	○	○	○	○	○	○	○
Common Raven	<i>Corvus corax</i>	●	●	●	●	●	●	●	●	●	●	●

Table 3-4. Parks where each species was observed, April through June 2012, cont.

Common name	Scientific name	CAGR	CHIR	CORO	FOBO	GICL	MOCA	ORPI	SAGU	TONT	TUMA	TUZI
Common Snipe	<i>Gallinago gallinago</i>						o	o			o	o
Common Tern	<i>Sterna hirundo</i>							o				
Common Yellowthroat	<i>Geothlypis trichas</i>					●	●	o	o		●	●
Cooper's Hawk	<i>Accipiter cooperii</i>	o	●	o	o	●	o	o	●	●	o	o
Cordilleran Flycatcher	<i>Empidonax occidentalis</i>		o	o		o		o	●			
Costa's Hummingbird	<i>Calypte costae</i>	o		o	o		o	●	●	●	o	o
Crested Caracara	<i>Caracara cheriway</i>							o	o			
Crissal Thrasher	<i>Toxostoma crissale</i>	o	●	o	●		●	●	●	●	o	o
Curve-billed Thrasher	<i>Toxostoma curvirostre</i>	o	o	o	●	o	o	●	●	●	●	
Dark-eyed Junco	<i>Junco hyemalis</i>		o	o	o	o	o	o	o	o	o	o
Dickcissel	<i>Spiza americana</i>							o				
Double-crested Cormorant	<i>Phalacrocorax auritus</i>							o		o	o	●
Dusky Flycatcher	<i>Empidonax oberholseri</i>		o	o	o	o	o		o	o	o	o
Dusky-capped Flycatcher	<i>Myiarchus tuberculifer</i>		●	o	o	o	●		●		●	o
Eared Grebe	<i>Podiceps nigricollis</i>							o				o
Eastern Bluebird	<i>Sialia sialis</i>		o	o					o			
Eastern Meadowlark	<i>Sturnella magna</i>		o	●	o		o	o	o			o
Eastern Phoebe	<i>Sayornis phoebe</i>							o			o	
Elegant Trogon	<i>Trogon elegans</i>		o	o			o		o			
Elf Owl	<i>Micrathene whitneyi</i>	o	o	o	o	o	o	o	o	o	o	o
Eurasian Collared-Dove	<i>Streptopelia decaocto</i>	●	●				o		●	o	o	●
European Starling	<i>Sturnus vulgaris</i>	●					o	o	o	o	●	o
Evening Grosbeak	<i>Coccothraustes vespertinus</i>		o				o	o	o			
Ferruginous Hawk	<i>Buteo regalis</i>	o	o				o	o				
Ferruginous Pygmy-Owl	<i>Glaucidium brasilianum</i>							●				
Flammulated Owl	<i>Otus flammeolus</i>		o	o		o			o			
Forster's Tern	<i>Sterna forsteri</i>							o				
Fox Sparrow	<i>Passerella iliaca</i>			o				o	o			
Franklin's Gull	<i>Larus pipixcan</i>											o
Gadwall	<i>Anas strepera</i>						o	o				o
Gambel's Quail	<i>Callipepla gambelii</i>	●	●	o	●	o	●	●	●	●	●	●

● = species detected in 2012 survey

●¹ = species detected in 2012 incidental to the survey, and newly recorded for the park

o = species not detected in 2012 survey, but known to occur in the park, including species that migrate through or winter in the park

Table 3-4. Parks where each species was observed, April through June 2012, cont.

Common name	Scientific name	CAGR	CHIR	CORO	FOBO	GICL	MOCA	ORPI	SAGU	TONT	TUMA	TUZI
Gila Woodpecker	<i>Melanerpes uropygialis</i>	●	○	●	○		●	●	●	●	●	●
Gilded Flicker	<i>Colaptes chrysoides</i>	●						●	●	●	●	
Golden Eagle	<i>Aquila chrysaetos</i>		○	○	○	○	○	○	○	○	○	○
Golden-crowned Kinglet	<i>Regulus satrapa</i>		○					○	○			
Golden-crowned Sparrow	<i>Zonotrichia atricapilla</i>							○				
Golden-winged Warbler	<i>Vermivora chrysoptera</i>							○				
Grace's Warbler	<i>Dendroica graciae</i>		●			●		○	●			
Grasshopper Sparrow	<i>Ammodramus savannarum</i>		○	○	○							
Gray Catbird	<i>Dumetella carolinensis</i>					○						
Gray Flycatcher	<i>Empidonax wrightii</i>	○	●	●	●	●	●	●	●	●	●	○
Gray Hawk	<i>Buteo nitidus</i>		○						○	○	●	
Gray Vireo	<i>Vireo vicinior</i>		○		●		○	○	●	●	○	○
Great Blue Heron	<i>Ardea herodias</i>	○	○			○	●	○	○	○	○	●
Great Egret	<i>Ardea alba</i>	●					●	○			○	○
Great Horned Owl	<i>Bubo virginianus</i>	●	○	○	●	●	●	○	●	○	○	●
Greater Pewee	<i>Contopus pertinax</i>		○	○		○			●			
Greater Roadrunner	<i>Geococcyx californianus</i>	●	○	○	○	○	○	●	●	○	○	○
Greater White-fronted Goose	<i>Anser albifrons</i>						○					○
Greater Yellowlegs	<i>Tringa melanoleuca</i>						○	○				○
Great-tailed Grackle	<i>Quiscalus mexicanus</i>	●	○		○		○	○	●	○	○	●
Green Heron	<i>Butorides virescens</i>						○	○				●
Green Kingfisher	<i>Chloroceryle americana</i>										○	
Green-tailed Towhee	<i>Pipilo chlorurus</i>	○	●	○	●	●	○	●	●	●	●	○
Green-winged Teal	<i>Anas crecca</i>						○	○				○
Hairy Woodpecker	<i>Picoides villosus</i>		●	○		●			●			
Hammond's Flycatcher	<i>Empidonax hammondii</i>	○	●	○	○	○	○	●	○	○	○	○
Harris's Hawk	<i>Parabuteo unicinctus</i>	○		○				●	●	○	○	
Heermann's Gull	<i>Larus heermanni</i>							○				
Hepatic Tanager	<i>Piranga flava</i>		●	●	●	●	○		●		○	
Hermit Thrush	<i>Catharus guttatus</i>		●	○	●	●	○	○	●	○	○	○
Hermit Warbler	<i>Dendroica occidentalis</i>	○	○	○			●	○	○			
Herring Gull	<i>Larus argentatus</i>							○				
Hooded Merganser	<i>Lophodytes cucullatus</i>							○	○			○

Table 3-4. Parks where each species was observed, April through June 2012, cont.

Common name	Scientific name	CAGR	CHIR	CORO	FOBO	GICL	MOCA	ORPI	SAGU	TONT	TUMA	TUZI
Hooded Oriole	<i>Icterus cucullatus</i>	o	o	o	●		●	o	●	●	●	●
Horned Lark	<i>Eremophila alpestris</i>	●	o	o	o		o	o				o
House Finch	<i>Carpodacus mexicanus</i>	●	●	●	●	●	●	●	●	●	●	●
House Sparrow	<i>Passer domesticus</i>	●		o			o	o	o	o	●	o
House Wren	<i>Troglodytes aedon</i>		o	o	o	●	o	o	●	o	o	o
Hutton's Vireo	<i>Vireo huttoni</i>		●	o	o	o	o	o	o	o	o	o
Inca Dove	<i>Columbina inca</i>	o		o			o	o	o		o	o
Indigo Bunting	<i>Passerina cyanea</i>				o	o	●	o	o	o	●	o
Juniper Titmouse	<i>Baeolophus ridgwayi</i>		●		o	●	o		o			
Killdeer	<i>Charadrius vociferus</i>	●	o		o	●	o	o	o		o	o
Ladder-backed Woodpecker	<i>Picoides scalaris</i>	●	●	●	●	o	●	●	●	●	●	●
Lark Bunting	<i>Calamospiza melanocorys</i>	o		o	o	o	o	●	o			o
Lark Sparrow	<i>Chondestes grammacus</i>	●	o	●	●	●	o	o	●	o	●	o
Lawrence's Goldfinch	<i>Carduelis lawrencei</i>							o	o			
Lazuli Bunting	<i>Passerina amoena</i>	●	●	●	●	o	●	●	●	o	●	●
Le Conte's Thrasher	<i>Toxostoma lecontei</i>							o				
Least Bittern	<i>Ixobrychus exilis</i>							o				o
Least Grebe	<i>Tachybaptus dominicus</i>							o				
Least Sandpiper	<i>Calidris minutilla</i>						o	o				o
Least Tern	<i>Sterna antillarum</i>							o				
Lesser Goldfinch	<i>Carduelis psaltria</i>	o	●	o	o	o	●	●	●	●	●	●
Lesser Nighthawk	<i>Chordeiles acutipennis</i>	●			o		o	●	o	o	o	o
Lesser Scaup	<i>Aythya affinis</i>						o	o				o
Lesser Yellowlegs	<i>Tringa flavipes</i>						o	o				o
Lewis's Woodpecker	<i>Melanerpes lewis</i>					o	o	o	o		o	
Lincoln's Sparrow	<i>Melospiza lincolnii</i>	o	o	o	o	o	●	o	o	o	o	o
Loggerhead Shrike	<i>Lanius ludovicianus</i>	o	o	o	●		o	●	o	●	o	o
Long-billed Curlew	<i>Numenius americanus</i>							o				
Long-billed Dowitcher	<i>Limnodromus scolopaceus</i>							o				
Long-eared Owl	<i>Asio otus</i>		o		o	o		o	o			
Louisiana Waterthrush	<i>Parkesia motacilla</i>										o	

● = species detected in 2012 survey

●¹ = species detected in 2012 incidental to the survey, and newly recorded for the park

o = species not detected in 2012 survey, but known to occur in the park, including species that migrate through or winter in the park

Table 3-4. Parks where each species was observed, April through June 2012, cont.

Common name	Scientific name	CAGR	CHIR	CORO	FOBO	GICL	MOCA	ORPI	SAGU	TONT	TUMA	TUZI
Lucifer Hummingbird	<i>Calothorax lucifer</i>			o								
Lucy's Warbler	<i>Oreothlypis luciae</i>	●	o	o	●	o	●	●	●	●	●	●
MacGillivray's Warbler	<i>Oporornis tolmiei</i>	o	●	o	●	o	●	●	●	o	o	o
Magnificent Hummingbird	<i>Eugenes fulgens</i>		●	o					o			
Magnolia Warbler	<i>Dendroica magnolia</i>							o				
Mallard	<i>Anas platyrhynchos</i>	o				o	●	o	o	o	o	●
Marsh Wren	<i>Cistothorus palustris</i>						o	o	o		o	●
Merlin	<i>Falco columbarius</i>	o		o	o	o	o	o	o	o	o	o
Mexican Chickadee	<i>Poecile sclateri</i>		●									
Mexican Jay	<i>Aphelocoma ultramarina</i>		●	●	o	o	o		●			
Mississippi Kite	<i>Ictinia mississippiensis</i>										o	
Montezuma Quail	<i>Cyrtonyx montezumae</i>		●	●	o	o			o			
Mountain Bluebird	<i>Sialia currucoides</i>		o	o			o	o	o		o	o
Mountain Chickadee	<i>Poecile gambeli</i>					●			●			
Mourning Dove	<i>Zenaida macroura</i>	●	●	●	●	●	●	●	●	●	●	●
Nashville Warbler	<i>Oreothlypis ruficapilla</i>	o	o	o	o		o	●	●	o	o	o
Northern Beardless-Tyrannulet	<i>Camptostoma imberbe</i>		o				●	o	o	o	●	o
Northern Cardinal	<i>Cardinalis cardinalis</i>	o	●	o	●		●	o	●	●	●	●
Northern Flicker	<i>Colaptes auratus</i>	o	●	o	o	●	●	o	●	o	o	●
Northern Goshawk	<i>Accipiter gentilis</i>		o	o		o	o		o			
Northern Harrier	<i>Circus cyaneus</i>	o	o	o	o		o	o	o	o	●	o
Northern Mockingbird	<i>Mimus polyglottos</i>	o	●	●	●	●	●	●	●	●	o	●
Northern Parula	<i>Parula americana</i>								o		o	
Northern Pintail	<i>Anas acuta</i>						o	o				o
Northern Pygmy-Owl	<i>Glaucidium gnoma</i>		●	o	o	o	o		o			
Northern Rough-winged Swallow	<i>Stelgidopteryx serripennis</i>	●	o		●	o	●	o	o	●	●	●
Northern Saw-whet Owl	<i>Aegolius acadicus</i>		o	o		o	o		o			
Northern Shoveler	<i>Anas clypeata</i>						o	o				o
Northern Waterthrush	<i>Parkesia noveboracensis</i>				o		o	o			o	o
Olive Warbler	<i>Peucedramus taeniatus</i>		o			o			●			
Olive-sided Flycatcher	<i>Contopus cooperi</i>		o		o		o	o	●	o	o	o
Orange-crowned Warbler	<i>Oreothlypis celata</i>	o	●	o	●	●	o	●	●	o	o	o
Osprey	<i>Pandion haliaetus</i>		o		o		o	o	o	o		o

Table 3-4. Parks where each species was observed, April through June 2012, cont.

Common name	Scientific name	CAGR	CHIR	CORO	FOBO	GICL	MOCA	ORPI	SAGU	TONT	TUMA	TUZI
Ovenbird	<i>Seiurus aurocapilla</i>		o	o				o			o	
Pacific-slope Flycatcher	<i>Empidonax difficilis</i>		●	o	●		o	●	o	o	o	o
Painted Bunting	<i>Passerina ciris</i>							o			o	
Painted Redstart	<i>Myioborus pictus</i>	o	●	o		●	o	o	●	o		
Peregrine Falcon	<i>Falco peregrinus</i>	o	●	o	o	o	●	●	●	o	o	o
Phainopepla	<i>Phainopepla nitens</i>	o	●	●	●		●	●	●	●	●	●
Pied-billed Grebe	<i>Podilymbus podiceps</i>						o	o				o
Pine Siskin	<i>Spinus pinus</i>		●	●	o	●	o	o	o	o	o	o
Pinyon Jay	<i>Gymnorhinus cyanocephalus</i>		o	o		o	o		o			
Plain-capped Starthroat	<i>Heliomaster constantii</i>			o								
Plumbeous Vireo	<i>Vireo plumbeus</i>		●	o	o	●	o		●	o	●	o
Prairie Falcon	<i>Falco mexicanus</i>	o	o	●	o	o	o	o	o	o		o
Purple Finch	<i>Carpodacus purpureus</i>							o	o			
Purple Martin	<i>Progne subis</i>		o			●	o	o	o	o	o	o
Pygmy Nuthatch	<i>Sitta pygmaea</i>		●			●			●			
Pyrrhuloxia	<i>Cardinalis sinuatus</i>	o	o	o	●			●	●	o	●	
Red Crossbill	<i>Loxia curvirostra</i>		o			o	o		o			o
Red Phalarope	<i>Phalaropus fulicarius</i>							o				
Red-breasted Merganser	<i>Mergus serrator</i>							o				
Red-breasted Nuthatch	<i>Sitta canadensis</i>		o	o		o	o	o	●			
Red-breasted Sapsucker	<i>Sphyrapicus ruber</i>							o				
Red-eyed Vireo	<i>Vireo olivaceus</i>							o				
Red-faced Warbler	<i>Cardellina rubrifrons</i>		o	o		o			●			
Redhead	<i>Aythya americana</i>						o	o				o
Red-naped Sapsucker	<i>Sphyrapicus nuchalis</i>		o	o	o	●	o	o	o	o		o
Red-necked Phalarope	<i>Phalaropus lobatus</i>							o				
Red-tailed Hawk	<i>Buteo jamaicensis</i>	●	●	o	●	o	●	●	●	o	●	●
Red-winged Blackbird	<i>Agelaius phoeniceus</i>	●					●	o	o	o	o	●
Ring-billed Gull	<i>Larus delawarensis</i>							o				o
Ring-necked Duck	<i>Aythya collaris</i>							o				o
Rock Pigeon	<i>Columba livia</i>	●		o			o	o	o		o	o

● = species detected in 2012 survey

●¹ = species detected in 2012 incidental to the survey, and newly recorded for the park

o = species not detected in 2012 survey, but known to occur in the park, including species that migrate through or winter in the park

Table 3-4. Parks where each species was observed, April through June 2012, cont.

Common name	Scientific name	CAGR	CHIR	CORO	FOBO	GICL	MOCA	ORPI	SAGU	TONT	TUMA	TUZI
Rock Wren	<i>Salpinctes obsoletus</i>	o	●	●	●	o	●	●	●	●	o	o
Roseate Spoonbill	<i>Platalea ajaja</i>							o				
Rose-breasted Grosbeak	<i>Pheucticus ludovicianus</i>			o				o				
Rose-throated Becard	<i>Pachyramphus aglaiae</i>										o	
Rough-legged Hawk	<i>Buteo lagopus</i>		o								o	
Ruby-crowned Kinglet	<i>Regulus calendula</i>	o	●	o	o	●	o	o	o	o	●	o
Ruddy Duck	<i>Oxyura jamaicensis</i>						o	o				o
Rufous Hummingbird	<i>Selasphorus rufus</i>		o	o	o	o	o	●	o	o	o	o
Rufous-crowned Sparrow	<i>Aimophila ruficeps</i>		●	●	●	●	●	o	●	●	o	o
Rufous-winged Sparrow	<i>Aimophila carpalis</i>	o			o			o	●	o	●	
Sabine's Gull	<i>Xema sabini</i>											o
Sage Sparrow	<i>Amphispiza belli</i>						o	o				o
Sage Thrasher	<i>Oreoscoptes montanus</i>					o	o	o	o			
Sandhill Crane	<i>Grus canadensis</i>	o	o		o			o				
Savannah Sparrow	<i>Passerculus sandwichensis</i>		o	o	o			o			●	
Say's Phoebe	<i>Sayornis saya</i>	●	●	●	●	●	●	o	●	●	●	●
Scaled Quail	<i>Callipepla squamata</i>		o	o	●				o			
Scarlet Tanager	<i>Piranga olivacea</i>							o				
Scissor-tailed Flycatcher	<i>Tyrannus forficatus</i>							o				
Scott's Oriole	<i>Icterus parisorum</i>		●	●	●		●	●	●	●	o	o
Semipalmated Plover	<i>Charadrius semipalmatus</i>							o				
Sharp-shinned Hawk	<i>Accipiter striatus</i>	o	o	o	o	o	o	o	o	o	o	o
Short-eared Owl	<i>Asio flammeus</i>						o					
Short-tailed Hawk	<i>Buteo brachyurus</i>		o								● ¹	
Snow Goose	<i>Chen caerulescens</i>						o					
Snowy Egret	<i>Egretta thula</i>						o	o			o	o
Solitary Sandpiper	<i>Tringa solitaria</i>						o	o				o
Song Sparrow	<i>Melospiza melodia</i>				o	o	●	o	o		●	●
Sora	<i>Porzana carolina</i>							o				o
Spotted Owl	<i>Strix occidentalis</i>		o						o			
Spotted Sandpiper	<i>Actitis macularius</i>				o	o	o	o	o		o	o
Spotted Towhee	<i>Pipilo maculatus</i>		●	●	●	●	●	●	●	o	●	o
Steller's Jay	<i>Cyanocitta stelleri</i>		●	o	o	●		o	●	o		

Table 3-4. Parks where each species was observed, April through June 2012, cont.

Common name	Scientific name	CAGR	CHIR	CORO	FOBO	GICL	MOCA	ORPI	SAGU	TONT	TUMA	TUZI
Stilt Sandpiper	<i>Calidris himantopus</i>							o				
Streak-backed Oriole	<i>Icterus pustulatus</i>										o	
Sulphur-bellied Flycatcher	<i>Myiodynastes luteiventris</i>		o	o					o			
Summer Tanager	<i>Piranga rubra</i>		●	o	o	o	●	o	●	o	●	●
Swainson's Hawk	<i>Buteo swainsoni</i>	o	o	o	o	o	o	●	o	o	o	o
Swainson's Thrush	<i>Catharus ustulatus</i>		o	o	o	o	o	o		o	o	o
Swamp Sparrow	<i>Melospiza georgiana</i>							o				
Tennessee Warbler	<i>Oreothlypis peregrina</i>							o				
Thick-billed Kingbird	<i>Tyrannus crassirostris</i>							o		o	●	
Townsend's Solitaire	<i>Myadestes townsendi</i>		●	o	o	o	o	o	o	o	o	o
Townsend's Warbler	<i>Dendroica townsendi</i>		●	●	●	o	o	●	o	o	o	o
Tree Swallow	<i>Tachycineta bicolor</i>	o				o	o	o	o		●	o
Tropical Kingbird	<i>Tyrannus melancholicus</i>							o			●	
Turkey Vulture	<i>Cathartes aura</i>	o	●	●	●	●	●	●	●	●	●	o
Varied Bunting	<i>Passerina versicolor</i>							o	o		o	
Varied Thrush	<i>Ixoreus naevius</i>							o				
Vaux's Swift	<i>Chaetura vauxi</i>				o		o	o	o	o	●	
Verdin	<i>Auriparus flaviceps</i>	●	●	o	●		●	●	●	●	●	●
Vermilion Flycatcher	<i>Pyrocephalus rubinus</i>	o	●	o	o	o	o	o	●	o	●	●
Vesper Sparrow	<i>Poocetes gramineus</i>	o	o	o	o	o	o	o	o		o	o
Violet-crowned Hummingbird	<i>Amazilia violiceps</i>			o							o	
Violet-green Swallow	<i>Tachycineta thalassina</i>	●	●	●	o	●	●	●	●	●	o	●
Virginia Rail	<i>Rallus limicola</i>											●
Virginia's Warbler	<i>Oreothlypis virginiae</i>	o	●	o	●	●	o	●	●	●	o	o
Warbling Vireo	<i>Vireo gilvus</i>		●	o	o	●	●	o	●	o	●	●
Western Bluebird	<i>Sialia mexicana</i>		●	o	o	o	o	o	●	o		o
Western Grebe	<i>Aechmophorus occidentalis</i>							o				
Western Kingbird	<i>Tyrannus verticalis</i>	●	o	●	●	●	●	●	●	o	●	●
Western Meadowlark	<i>Sturnella neglecta</i>	o	o	o	o		o	o	o	o	●	o
Western Sandpiper	<i>Calidris mauri</i>	o					o	o				o
Western Screech-Owl	<i>Megascops kennicottii</i>	o	o	o	o	o	o	o	o	o	o	o

● = species detected in 2012 survey

●¹ = species detected in 2012 incidental to the survey, and newly recorded for the park

o = species not detected in 2012 survey, but known to occur in the park, including species that migrate through or winter in the park

Table 3-4. Parks where each species was observed, April through June 2012, cont.

Common name	Scientific name	CAGR	CHIR	CORO	FOBO	GICL	MOCA	ORPI	SAGU	TONT	TUMA	TUZI
Western Scrub-Jay	<i>Aphelocoma californica</i>		●	●	●	●	○		●	●	○	●
Western Tanager	<i>Piranga ludoviciana</i>	○	●	○	●	●	●	○	●	○	●	●
Western Wood-Pewee	<i>Contopus sordidulus</i>	○	●	○	●	●	●	○	●	○	○	●
Whip-poor-will	<i>Caprimulgus vociferus</i>		○	○		○			○			
Whiskered Screech-Owl	<i>Megascops trichopsis</i>		○	○					○			
White-breasted Nuthatch	<i>Sitta carolinensis</i>		●	○	○	●	○		●		○	○
White-crowned Sparrow	<i>Zonotrichia leucophrys</i>	○	●	○	●	○	○	●	●	●	●	○
White-eared Hummingbird	<i>Hylocharis leucotis</i>		○	○							○	
White-faced Ibis	<i>Plegadis chihi</i>	●						○			○	○
White-tailed Kite	<i>Elanus leucurus</i>			○				○				
White-throated Sparrow	<i>Zonotrichia albicollis</i>				○			○			○	
White-throated Swift	<i>Aeronautes saxatalis</i>	○	●	●	○	○	●	○	●	○	○	○
White-winged Dove	<i>Zenaida asiatica</i>	●	●	●	●	●	●	●	●	●	●	○
Wild Turkey	<i>Meleagris gallopavo</i>		○	○		●			●			
Willet	<i>Tringa semipalmata</i>						○	○				
Williamson's Sapsucker	<i>Sphyrapicus thyroideus</i>		○	○		○	○		○			
Willow Flycatcher	<i>Empidonax traillii</i>					○		○				○
Wilson's Phalarope	<i>Phalaropus tricolor</i>						○	○				○
Wilson's Warbler	<i>Wilsonia pusilla</i>	●	●	○	●	●	●	●	●	○	●	●
Wood Duck	<i>Aix sponsa</i>						●	○				●
Wood Stork	<i>Mycteria americana</i>							○				
Worm-eating Warbler	<i>Helmitheros vermivorum</i>										○	
Yellow Warbler	<i>Dendroica petechia</i>	○	○	○	○	●	●	○	●	○	●	●
Yellow-bellied Sapsucker	<i>Sphyrapicus varius</i>									○		
Yellow-billed Cuckoo	<i>Coccyzus americanus</i>		○	○	○	○	○		○	○	○	○
Yellow-breasted Chat	<i>Icteria virens</i>			○	○	●	●	○	○	○	●	●
Yellow-eyed Junco	<i>Junco phaeonotus</i>		●	○					●			
Yellow-green Vireo	<i>Vireo flavoviridis</i>								○			
Yellow-headed Blackbird	<i>Xanthocephalus xanthocephalus</i>	○				○	○	○	○	○	○	○
Yellow-rumped Warbler	<i>Dendroica coronata</i>	●	●	●	●	●	●	●	●	●	●	○
Yellow-throated Vireo	<i>Vireo flavifrons</i>						○			○	○	
Zone-tailed Hawk	<i>Buteo albonotatus</i>	○	●	○	●	●	○	○	○	○	●	○

● = species detected in 2012 survey

●¹ = species detected in 2012 incidental to survey, and newly recorded for the park

○ = species not detected in 2012 survey, but known to occur in the park, including species that migrate through or winter in the park

3.1 Casa Grande Ruins National Monument

3.1.1 2012 sampling

During May of 2012, we sampled one grid at Casa Grande Ruins NM (Figure 3.1.1). The grid was in upland (desert scrub) habitat (Table 3.1.1). The nine points on the grid were surveyed two times for a total of 18 point counts at the park in 2012.

3.1.2 Results and discussion

During 2012, 648 birds of 40 species were counted at Casa Grande Ruins NM (Table 3.1.2). Great-tailed Grackle had the highest number of individuals counted (20% of the total number of birds counted), followed by Rock Pigeon (17%), Mourning Dove (10%), Red-winged Blackbird (8%), and European Starling (7%). No new species were detected for the park during the surveys. However, note that Bank Swallow, which was observed in 2012, was recorded for the first time in 2011 (but mistakenly not reported as a new species for the park last year).

Note that the following discussion is based on observations of the field crew, and it includes

information of interest to the park that is not restricted to data collected on surveys.

Flyover detections at lengthy distances in the open desert and surrounding agricultural habitats are the usual trend, given the sparse desert vegetation and flat terrain with good visibility. Similar to last year, numbers of Mourning Dove, Great-tailed Grackle, Rock Pigeon, Red-winged Blackbird, European Starling and House Finch were high. In contrast to the extensive creosote habitat dominating the park, the small section of saguaro, mesquite, ocotillo, and palo verde at the visitor center hosted the most diversity, with nesting Gilded Flicker and American Kestrel, Anna's and Black-chinned Hummingbirds, Bronzed Cowbird, Bullock's Oriole, Western Wood-Pewee, Lucy's Warbler, Bell's Vireo, Western Tanager and Black-headed Grosbeak. Nesting Burrowing Owls held the same territories as in 2011, and Great Horned Owls with large juveniles again bred in the ruins ramada. Greater Roadrunner, Gambel's Quail, Lesser Nighthawk, Common Raven and Red-tailed Hawk were counted in higher numbers than last year.

Table 3.1.1. Habitat type, number of points, and sampling dates for each transect or grid at Casa Grande Ruins NM, 2012

Transect/Grid	Habitat class	Habitat type	# points	# visits	Visit 1	Visit 2
U	Upland	Desert scrub	9	2	5/10/2012	5/14/2012



GARY KRAMER, USFWS

Three Greater Roadrunners (*Geococcyx californianus*) were observed at Casa Grande Ruins NM in 2012.

Table 3.1.2. Number of birds counted of each species in desert scrub habitat, Casa Grande Ruins NM, 2012

Species	# of birds counted		Species	# of birds counted	
	Total (desert scrub habitat)	% of total		Total (desert scrub habitat)	% of total
Great-tailed Grackle	128	20	Say's Phoebe	1	0
Rock Pigeon	113	17	Wilson's Warbler	1	0
Mourning Dove	66	10	Total	648	100
Red-winged Blackbird	52	8			
European Starling	46	7			
White-winged Dove	31	5			
Eurasian Collared-Dove	29	4			
Gambel's Quail	26	4			
White-faced Ibis	17	3			
Gila Woodpecker	14	2			
Ash-throated Flycatcher	10	2			
House Finch	10	2			
Verdin	10	2			
Anna's Hummingbird	9	1			
Cliff Swallow	9	1			
House Sparrow	9	1			
Burrowing Owl	7	1			
Killdeer	7	1			
Yellow-rumped Warbler	6	1			
Western Kingbird	5	1			
American Kestrel	4	1			
Lark Sparrow	4	1			
Northern Rough-winged Swallow	4	1			
Barn Swallow	3	0			
Common Raven	3	0			
Gilded Flicker	3	0			
Great Horned Owl	3	0			
Greater Roadrunner	3	0			
Lucy's Warbler	3	0			
Violet-green Swallow	3	0			
Bank Swallow	2	0			
Bullock's Oriole	1	0			
Great Egret	1	0			
Horned Lark	1	0			
Ladder-backed Woodpecker	1	0			
Lazuli Bunting	1	0			
Lesser Nighthawk	1	0			
Red-tailed Hawk	1	0			

Note: New species that have not previously been verified for the park are shown in bold and shaded. Species are listed in rank order of detection, from the most to least commonly observed. Relative detectability among species has not been taken into account; thus, rank order provides only a general indication of relative abundance. Detectability will be explicitly accounted for in periodic synthesis reports. Because of the potential to confound future comparisons, these values exclude observations of species flying overhead/not using the habitat. Species noted as incidental were identified by our birding team, but not as part of our regular survey.

3.2 Chiricahua National Monument

3.2.1 2012 sampling

During May of 2012, we sampled six transects/grids, each with seven points, two times for a total sample of 84 point counts at Chiricahua NM (Figure 3.2.1). All transects were in the upland habitat class of either grassland/savanna or woodland habitat types (Table 3.2.1).

3.2.2 Results and discussion

During 2012, 1,268 birds of 92 species were counted at Chiricahua NM (Table 3.2.2). Mexican Jay had the highest number of individuals counted (9% of the total number of birds counted). The next species counted in the highest numbers were Bewick's Wren (6%), Ash-throated Flycatcher (6%), Black-headed Grosbeak (5%), and Spotted Towhee (5%).

The Horseshoe 2 fire of May 2011 burned most of the park and all six bird transects were affected, with Whitetail Canyon and Pickett Canyon the most severely burned. Vegetation regeneration from spring 2011 to spring 2012 was surprisingly quick, with grasses, wildflowers, yuccas, agaves, and small shrubs dominating the barren rocky ground. The most severely burned areas were almost devoid of any large live shrubs and trees, as most oaks, junipers, pines, and riparian vegetation were completely charred.

Note that the following discussion is based on observations of the field crew, and it includes information of interest to the park that is not restricted to data collected during surveys.

Species diversity and detections were considerably low in Whitetail and Pickett Canyons with the altered habitat, although a few unexpected species were noted; these included American Kestrel, Blue-throated Hummingbird, Mexi-



Mexican Jay (*Aphelocoma ultramarina*) accounted for 9% of all birds counted at Chiricahua NM in 2012.

can Chickadee, and Juniper Titmouse. Rufous-crowned Sparrow, Canyon Towhee, Northern Mockingbird, Common Raven, and Mexican Jay were the most numerous species in the burned areas, and in the unburned sections Black-throated Gray Warbler, Acorn Woodpecker, Bewick's Wren, Spotted Towhee, Ash-throated Flycatcher, Scott's Oriole, Black-headed Grosbeak, Plumbeous Vireo, and Cassin's Kingbird were present in high numbers. Hepatic Tanager, Band-tailed Pigeon, and Arizona Woodpecker also seemed more numerous this year.

Notable sightings included a Peregrine Falcon carrying prey in Pickett Canyon in suitable nesting habitat where they have bred in the past, and an immature Gray Hawk along Bonita Creek, a species that is rare in the area and has not been recorded in the park in many years. A Townsend's Solitaire in Whitetail Canyon and a Crissal Thrasher at Massai Point were unusual for habitat and elevation, and Wild Turkey sightings by park staff were also more frequent than previous years. Eurasian Collared-Dove seems to have invaded the lower sections of Bonita Creek; high numbers were noted at the park entrance, and they could be expanding further up the canyon. One new species, Cassin's Vireo, was recorded in 2012.

Table 3.2.1. Habitat type, number of points, and sampling dates for each transect or grid, Chiricahua NM, 2012

Transect/Grid	Habitat class	Habitat type	# points	# visits	Visit 1	Visit 2
High3	Upland	Woodland	7	2	5/2/2012	5/23/2012
High4	Upland	Woodland	7	2	5/2/2012	5/26/2012
Mid1	Upland	Grassland/Savanna	7	2	5/3/2012	5/28/2012
Mid2	Upland	Grassland/Savanna	7	2	5/1/2012	5/22/2012
Picket	Upland	Woodland	7	2	5/1/2012	5/27/2012
White	Upland	Woodland	7	2	5/3/2012	5/24/2012

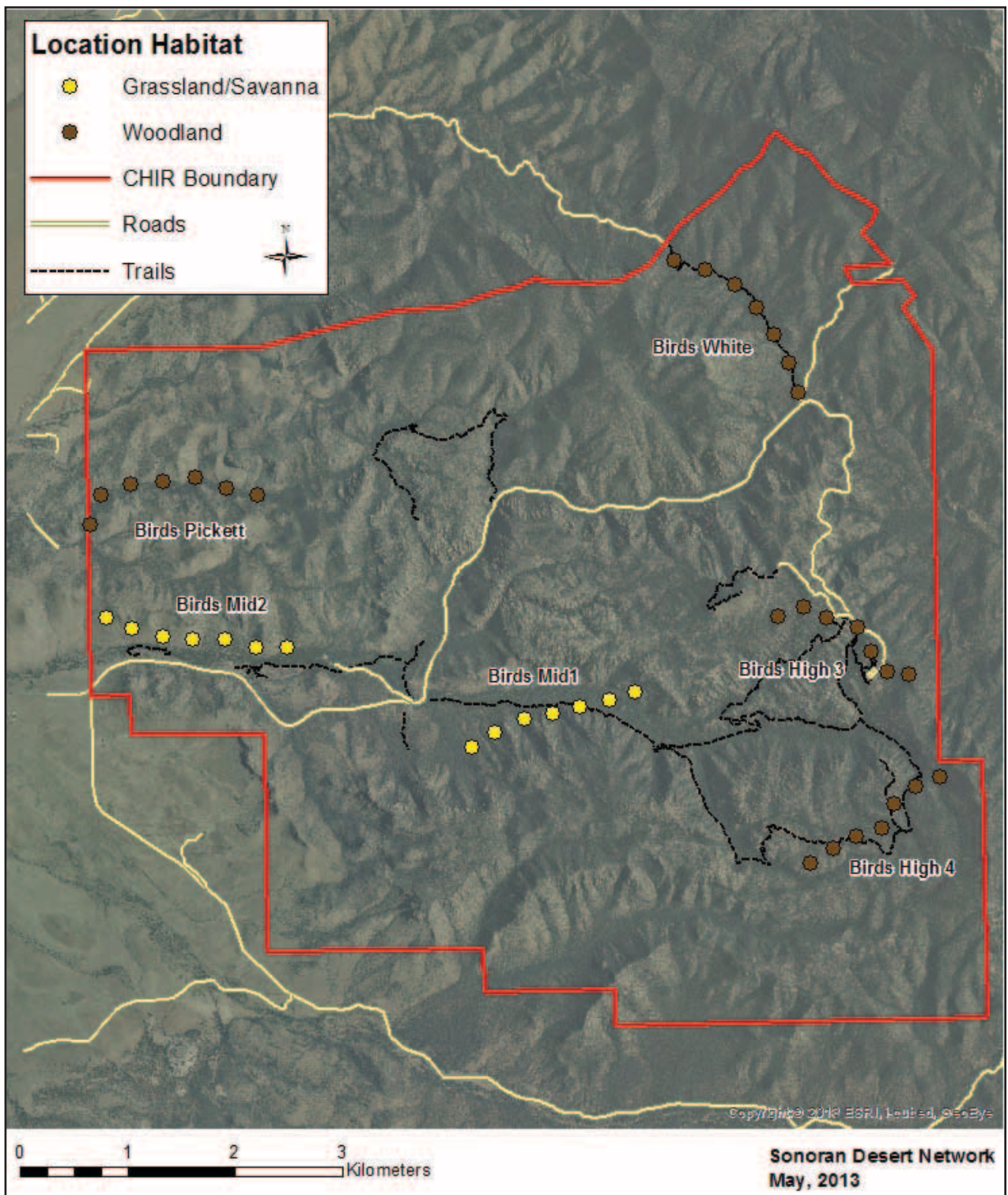


Figure 3.2.1. Point locations targeted for annual sampling at Chiricahua NM.

Table 3.2.2. Number of birds counted of each species in each habitat type, Chiricahua NM, 2012

Species	Habitat type		# of birds counted	
	Grassland/ Savanna	Woodland	Total	% of total
Mexican Jay	57	63	120	9
Bewick's Wren	29	48	77	6
Ash-throated Flycatcher	27	46	73	6
Black-headed Grosbeak	39	28	67	5
Spotted Towhee	15	50	65	5
Black-throated Gray Warbler	16	41	57	4
Common Raven	7	46	53	4
White-throated Swift	11	31	42	3
Turkey Vulture	8	34	42	3
Cassin's Kingbird	35	1	36	3
Canyon Wren	16	16	32	3
Rock Wren	9	19	28	2
Scott's Oriole	13	14	27	2
Hepatic Tanager	9	18	27	2
Rufous-crowned Sparrow	6	21	27	2
Mourning Dove	14	8	22	2
White-winged Dove	18	3	21	2
Broad-tailed Hummingbird	6	15	21	2
House Finch	17	3	20	2
Dusky-capped Flycatcher	13	6	19	1
Yellow-rumped Warbler	5	14	19	1
Arizona Woodpecker	8	9	17	1
Canyon Towhee	6	10	16	1
Eurasian Collared-Dove	15	---	15	1
Acorn Woodpecker	4	11	15	1
Violet-green Swallow	2	13	15	1
Band-tailed Pigeon	1	13	14	1
Pine Siskin	7	6	13	1
Blue-gray Gnatcatcher	3	10	13	1
Chipping Sparrow	3	10	13	1
White-breasted Nuthatch	6	5	11	1
Bushtit	5	6	11	1
Western Wood-Pewee	9	1	10	1
American Robin	1	9	10	1
Ladder-backed Woodpecker	3	6	9	1
Western Tanager	---	9	9	1
Black-chinned Hummingbird	8	---	8	1
Mexican Chickadee	1	7	8	1
Red-tailed Hawk	1	7	8	1
Townsend's Warbler	---	8	8	1
Hutton's Vireo	2	5	7	1

Table 3.2.2. Number of birds counted of each species in each habitat type, Chiricahua NM, 2012, cont.

Species	Habitat type		# of birds counted	
	Grassland/ Savanna	Woodland	Total	% of total
Gambel's Quail	6	---	6	0
Hairy Woodpecker	2	4	6	0
Hermit Thrush	2	4	6	0
Northern Flicker	---	6	6	0
Ruby-crowned Kinglet	---	6	6	0
Wilson's Warbler	1	4	5	0
Brown-crested Flycatcher	4	---	4	0
Brown-headed Cowbird	4	---	4	0
Northern Mockingbird	1	3	4	0
Plumbeous Vireo	1	3	4	0
Bridled Titmouse	---	4	4	0
Bullock's Oriole	3	---	3	0
Painted Redstart	3	---	3	0
Gray Flycatcher	---	3	3	0
Lazuli Bunting	---	3	3	0
Pygmy Nuthatch	---	3	3	0
Yellow-eyed Junco	---	3	3	0
Blue Grosbeak	2	---	2	0
Summer Tanager	2	---	2	0
Cactus Wren	1	1	2	0
Cassin's Vireo	1	1	2	0
Phainopepla	1	1	2	0
Western Scrub-Jay	1	1	2	0
American Kestrel	---	2	2	0
Crissal Thrasher	---	2	2	0
Juniper Titmouse	---	2	2	0
Magnificent Hummingbird	---	2	2	0
Orange-crowned Warbler	---	2	2	0
Verdin	---	2	2	0
Black-throated Sparrow	1	---	1	0
Cooper's Hawk	1	---	1	0
Lesser Goldfinch	1	---	1	0
Montezuma Quail	1	---	1	0
Northern Cardinal	1	---	1	0
Northern Pygmy-Owl	1	---	1	0
Say's Phoebe	1	---	1	0
Vermilion Flycatcher	1	---	1	0
Virginia's Warbler	1	---	1	0
Zone-tailed Hawk	1	---	1	0
Blue-throated Hummingbird	---	1	1	0
Grace's Warbler	---	1	1	0

Table 3.2.2. Number of birds counted of each species in each habitat type, Chiricahua NM, 2012, cont.

Species	Habitat type		# of birds counted	
	Grassland/ Savanna	Woodland	Total	% of total
Green-tailed Towhee	---	1	1	0
Hammond's Flycatcher	---	1	1	0
MacGillivray's Warbler	---	1	1	0
Pacific-slope Flycatcher	---	1	1	0
Peregrine Falcon	---	1	1	0
Steller's Jay	---	1	1	0
Townsend's Solitaire	---	1	1	0
Warbling Vireo	---	1	1	0
Western Bluebird	---	1	1	0
White-crowned Sparrow	---	1	1	0
Unidentified Bird	6	8	14	1
Unidentified Woodpecker	2	1	3	0
Unidentified Empidonax	---	1	1	0
Unidentified Flycatcher	---	1	1	0
Unidentified Hummingbird	---	1	1	0
Unidentified Tanager	---	1	1	0
Unidentified Thrasher	---	1	1	0
Unidentified Vireo	---	1	1	0
Unidentified Warbler	--	1	1	0
Total	508	760	1,268	100

Note: New species that have not previously been verified for the park are shown in bold and shaded. Species are listed in rank order of detection, from the most to least commonly observed. Relative detectability among species has not been taken into account; thus, rank order provides only a general indication of relative abundance. Detectability will be explicitly accounted for in periodic synthesis reports. Because of the potential to confound future comparisons, these values exclude observations of species flying overhead/not using the habitat. Species noted as incidental were identified by our birding team, but not as part of our regular survey.

3.3 Coronado National Memorial

3.3.1 2012 sampling

During April and May of 2012, we sampled two transects at Coronado NMem with seven or eight points each (Figure 3.3.1). The transects, one grassland/savanna and one woodland, were sampled twice (Table 3.3.1), for a total of 30 point counts at the park.

3.3.2 Results and discussion

During 2012, 451 birds of 50 species were counted at Coronado NMem (Table 3.3.2). Mourning Dove had the highest number of individuals counted (9%). The next species counted in the highest numbers were Eastern Meadowlark (9%), Lark Sparrow (8%), Ash-throated Flycatcher (6%), House Finch (6%), and Bushtit (5%). No new species were detected for the park.

Note that the following discussion is based on observations of the field crew and includes information of interest to the park that is not restricted to data collected during surveys.

The Monument Fire of June 2011 burned through most of the park. The mesquite grassland transect was the most severely burned with very few live mesquites and agaves remaining, and the grass

was very short and sparse while still regenerating. This accounted for the very few Botteri's Sparrows detected on transect, compared to the unburned private property adjacent to the transect which hosted many territorial Botteri's Sparrows. The species prefers a healthy mesquite grassland. However, Eastern Meadowlark, Western Kingbird, Mourning Dove, Lark Sparrow, White-winged Dove, Ash-throated Flycatcher, Canyon Towhee, Loggerhead Shrike, and Black-throated Sparrow were present in higher numbers in the altered habitat with the more exposed ground. An unexpected immature Prairie Falcon and Grasshopper Sparrow were the highlights of the grassland transect. Migrant diversity and numbers were quite low, probably due to the fire damage.

The montane transect at Montezuma Pass was slightly burned, and there were minimal changes in the expected bird detections. Spotted Towhee, Bewick's Wren, Bushtit, Rufous-crowned Sparrow, Mexican Jay, Western Scrub-Jay, and Cassin's Kingbird were most numerous. Montezuma Quail and Black-chinned Sparrow were counted in low numbers compared to recent years. The few migrants were represented by Townsend's Warbler, Warbling Vireo, Western Tanager and Broad-tailed Hummingbird, accounting for the low diversity and fewer birds observed in the windy conditions on both sampling dates.



© ROBERT SHANTZ

Lark Sparrow (*Chondestes grammacus*) was one of the most commonly counted species at Coronado NMem in 2012.

Table 3.3.1. Habitat type, number of points, and sampling dates for each transect or grid, Coronado NMem, 2012

Transect/Grid	Habitat class	Habitat type	# points	# visits	Visit 1	Visit 2
401	Upland	Grassland/Savanna	8	2	4/27/2012	5/9/2012
502	Upland	Woodland	7	2	4/26/2012	5/8/2012

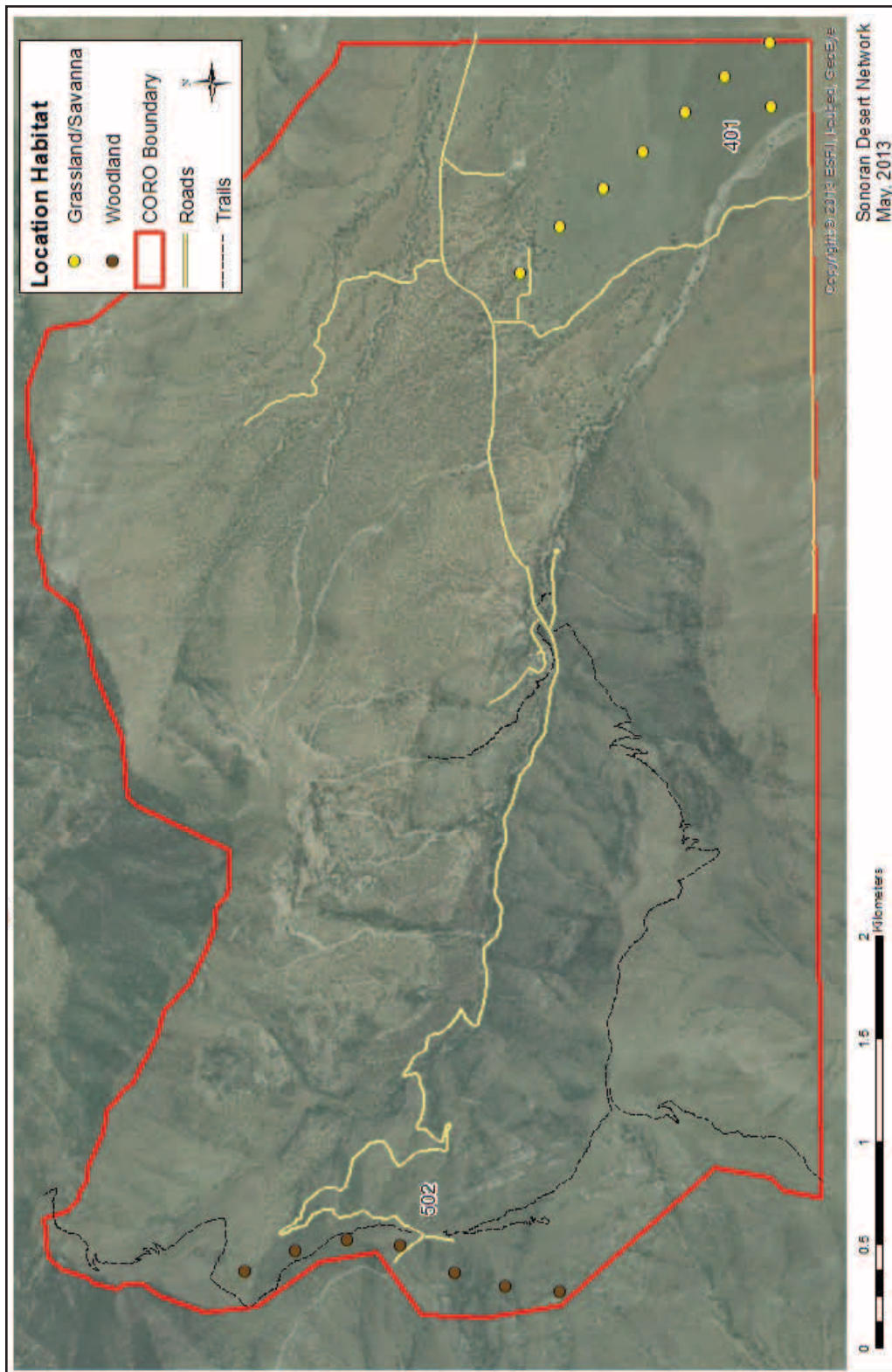


Figure 3.3.1. Point locations targeted for annual sampling at Coronado NM.

Table 3.3.2. Number of birds counted of each species in each habitat type, Coronado NMem, 2012

Species	Habitat type		# of birds counted	
	Grassland/ Savanna	Woodland	Total	% of total
Mourning Dove	42	---	42	9
Eastern Meadowlark	41	---	41	9
Lark Sparrow	25	11	36	8
Ash-throated Flycatcher	17	12	29	6
House Finch	16	9	25	6
Bushtit	6	18	24	5
Cassin's Kingbird	11	12	23	5
Western Kingbird	21	---	21	5
White-winged Dove	15	4	19	4
Scott's Oriole	10	9	19	4
Rufous-crowned Sparrow	2	17	19	4
Brewer's Sparrow	16	---	16	4
Bewick's Wren	5	10	15	3
Mexican Jay	3	7	10	2
Western Scrub-Jay	---	10	10	2
Common Raven	7	1	8	2
White-throated Swift	---	8	8	2
Spotted Towhee	---	7	7	2
Botteri's Sparrow	6	---	6	1
Rock Wren	1	5	6	1
Gila Woodpecker	5	---	5	1
Canyon Towhee	2	3	5	1
Bullock's Oriole	4	---	4	1
Black-throated Sparrow	3	1	4	1
Black-throated Gray Warbler	1	3	4	1
Brown-crested Flycatcher	3	---	3	1
Black-chinned Hummingbird	2	1	3	1
Ladder-backed Woodpecker	2	1	3	1
Yellow-rumped Warbler	1	2	3	1
Hepatic Tanager	---	3	3	1
Townsend's Warbler	---	3	3	1
Chipping Sparrow	2	---	2	0
Northern Mockingbird	2	---	2	0
Say's Phoebe	2	---	2	0
Acorn Woodpecker	1	1	2	0
Black-headed Grosbeak	1	1	2	0
Broad-tailed Hummingbird	1	1	2	0
Pine Siskin	1	1	2	0
Black-chinned Sparrow	---	2	2	0
Brown-headed Cowbird	1	---	1	0

Table 3.3.2. Number of birds counted of each species in each habitat type, Coronado NMem, 2012, cont.

Species	Habitat type		# of birds counted	
	Grassland/ Savanna	Woodland	Total	% of total
Cactus Wren	1	---	1	0
Phainopepla	1	---	1	0
Prairie Falcon	1	---	1	0
Turkey Vulture	1	---	1	0
Arizona Woodpecker	---	1	1	0
Canyon Wren	---	1	1	0
Gray Flycatcher	---	1	1	0
Lazuli Bunting	---	1	1	0
Montezuma Quail	---	1	1	0
Violet-green Swallow	---	1	1	0
Total	282	169	451	100%

Note: New species that have not previously been verified for the park are shown in bold and shaded. Species are listed in rank order of detection, from the most to least commonly observed. Relative detectability among species has not been taken into account; thus, rank order provides only a general indication of relative abundance. Detectability will be explicitly accounted for in periodic synthesis reports. Because of the potential to confound future comparisons, these values exclude observations of species flying overhead/not using the habitat. Species noted as incidental were identified by our birding team, but not as part of our regular survey.

3.4 Fort Bowie National Historic Site

3.4.1 2012 sampling

During April and May of 2012, we sampled two transects/grids at Fort Bowie NHS (Figure 3.4.1). One transect, with eight points, was in the riparian habitat class, and the other transect, with seven points, was in the upland habitat class (grassland/savanna habitat type; Table 3.4.1). Each transect was visited twice for a total of 30 point counts at the park in 2012.

3.4.2 Results and discussion

During 2012, 578 birds of 71 species were counted at Fort Bowie NHS (Table 3.4.2). Ash-throated Flycatcher had the highest number of individuals counted (8% of the total number of birds counted). Other species counted in relatively high numbers included White-winged Dove (7%), Northern Cardinal (6%), Turkey Vulture (6%), Black-throated Sparrow (5%), Mourning Dove (4%), and Black-chinned Hummingbird (4%). One new species for the park, Hepatic Tanager, was observed during the surveys.

The following discussion is based on observations of the field crew and includes information of interest to the park that is not restricted to data collected during surveys.

The riparian transect at Siphon Canyon with the flowing Apache Spring is a magnet for bird activity and supports good diversity and high detections. Summer breeders and migrants favor the narrow corridor, and species like Summer Tanager, Hooded Oriole, Cassin's Kingbird, Black-chinned Hummingbird, Bell's Vireo, and Lesser Goldfinch are closely tied to it for breeding. Nesting Zone-tailed and Cooper's Hawks were using the same nest sites as last year, the large roost of Turkey Vultures was also present, and nesting Crissal Thrasher, Western Scrub-Jay and Gray Vireo were also notable. Overall numbers



© ROBERT SHANTZ

Hepatic Tanager (*Piranga flava*) was recorded at the Historic Site for the first time in 2012.

of Ash-throated Flycatcher, Northern Mockingbird, Mourning Dove, Common Raven, Broad-tailed Hummingbird, Bewick's Wren and Lucy's Warbler seemed high, and Great Horned Owl and American Kestrel were also observed. Scaled Quail, a species that is sometimes not recorded at all, was present off transect in good numbers.

Shortly after the surveys were completed, the Apache Pass Fire burned just north of the park boundary, and some small sections of the park may have been slightly burned; however, it was a low intensity ground fire and there was not much damage.

Table 3.4.1. Habitat type, number of points, and sampling dates for each transect or grid, Fort Bowie NHS, 2012

Transect/Grid	Habitat class	Habitat type	# points	# visits	Visit 1	Visit 2
SPN	Riparian	Riparian	8	2	4/30/2012	5/21/2012
UpW	Upland	Grassland/Savanna	7	2	4/30/2012	5/29/2012

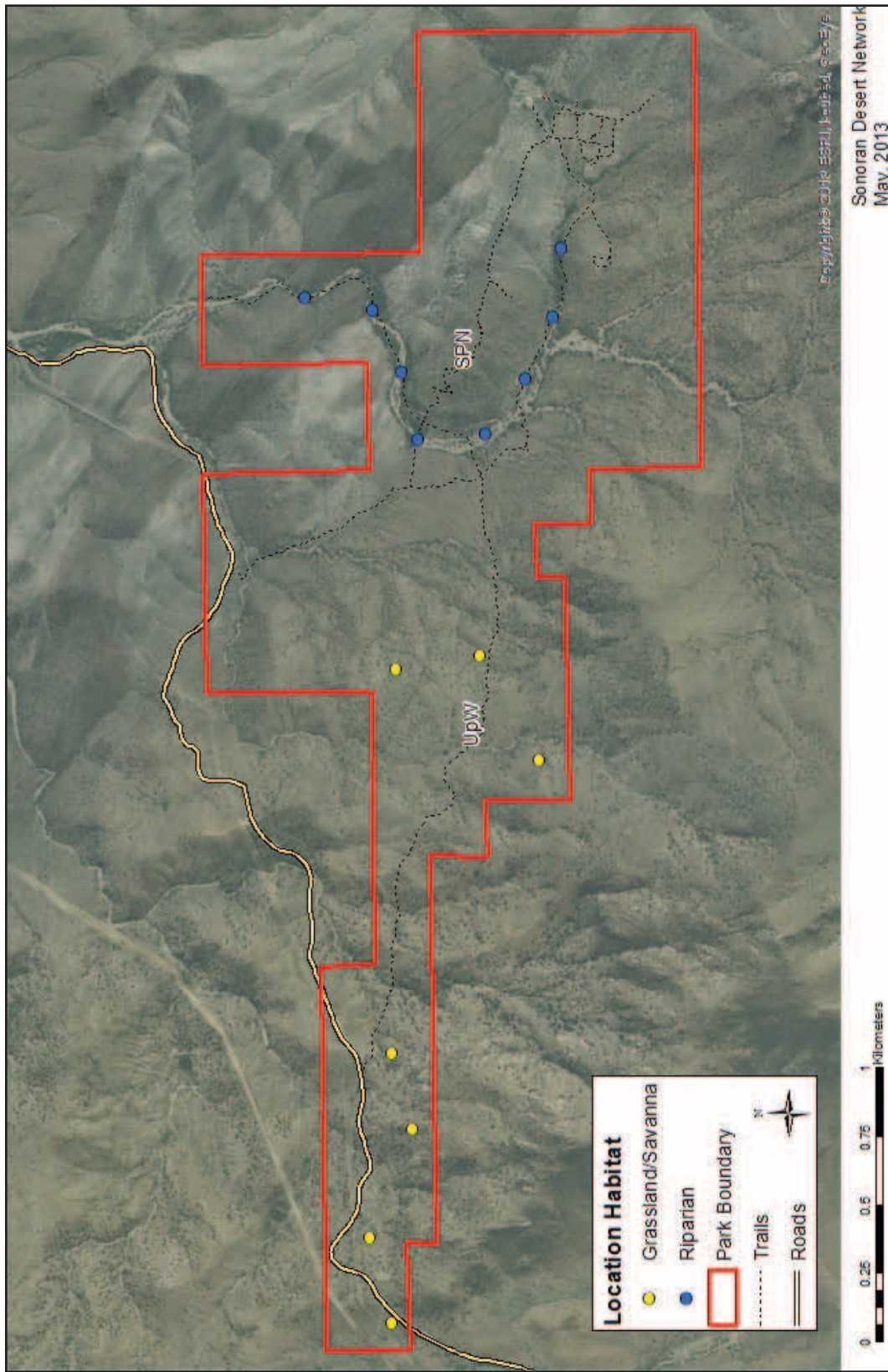


Figure 3.4.1. Point locations targeted for annual sampling at Fort Bowie NHS.

Table 3.4.2. Number of birds counted of each species in each habitat type, Fort Bowie NHS, 2012

Species	Habitat type		# of birds counted	
	Grassland/ Savanna	Riparian	Total	% of total
Ash-throated Flycatcher	23	23	46	8
White-winged Dove	9	32	41	7
Northern Cardinal	3	30	33	6
Turkey Vulture	4	28	32	6
Black-throated Sparrow	18	13	31	5
Mourning Dove	15	7	22	4
Black-chinned Hummingbird	5	16	21	4
House Finch	16	3	19	3
Ladder-backed Woodpecker	5	10	15	3
Rufous-crowned Sparrow	5	10	15	3
Brown-headed Cowbird	5	9	14	2
Bewick's Wren	3	10	13	2
Verdin	3	10	13	2
Cassin's Kingbird	4	8	12	2
Canyon Towhee	10	1	11	2
Scott's Oriole	5	6	11	2
Common Raven	10	---	10	2
Lucy's Warbler	4	6	10	2
Broad-tailed Hummingbird	2	8	10	2
Black-headed Grosbeak	3	6	9	2
Northern Rough-winged Swallow	8	---	8	1
Western Scrub-Jay	4	4	8	1
Gambel's Quail	---	8	8	1
Bushtit	7	---	7	1
Rock Wren	5	2	7	1
Wilson's Warbler	2	5	7	1
Chipping Sparrow	---	7	7	1
Blue Grosbeak	3	3	6	1
Scaled Quail	5	---	5	1
Northern Mockingbird	4	1	5	1
Cactus Wren	1	4	5	1
Green-tailed Towhee	1	4	5	1
Yellow-rumped Warbler	1	4	5	1
Zone-tailed Hawk	---	5	5	1
Lark Sparrow	4	---	4	1
Western Tanager	2	2	4	1
Gray Flycatcher	---	4	4	1
Hooded Oriole	---	4	4	1
Brewer's Sparrow	2	1	3	1
Crissal Thrasher	1	2	3	1

Table 3.4.2. Number of birds counted of each species in each habitat type, Fort Bowie NHS, 2012, cont.

Species	Habitat type		# of birds counted	
	Grassland/ Savanna	Riparian	Total	% of total
Curve-billed Thrasher	2	---	2	0
Loggerhead Shrike	2	---	2	0
Cassin's Vireo	---	2	2	0
MacGillivray's Warbler	---	2	2	0
Spotted Towhee	---	2	2	0
Townsend's Warbler	---	2	2	0
American Kestrel	1	---	1	0
Canyon Wren	1	---	1	0
Gray Vireo	1	---	1	0
Great Horned Owl	1	---	1	0
Orange-crowned Warbler	1	---	1	0
Pyrrhuloxia	1	---	1	0
Red-tailed Hawk	1	---	1	0
Western Kingbird	1	---	1	0
White-crowned Sparrow	1	---	1	0
Acorn Woodpecker	---	1	1	0
American Robin	---	1	1	0
Anna's Hummingbird	---	1	1	0
Black-throated Gray Warbler	---	1	1	0
Blue-gray Gnatcatcher	---	1	1	0
Broad-billed Hummingbird	---	1	1	0
Bronzed Cowbird	---	1	1	0
Bullock's Oriole	---	1	1	0
Hepatic Tanager	---	1	1	0
Hermit Thrush	---	1	1	0
Lazuli Bunting	---	1	1	0
Pacific-slope Flycatcher	---	1	1	0
Phainopepla	---	1	1	0
Say's Phoebe	---	1	1	0
Virginia's Warbler	---	1	1	0
Western Wood-Pewee	---	1	1	0
<i>Unidentified Corvid</i>	34	---	34	6
<i>Unidentified Bird</i>	6	---	6	1
<i>Unidentified Gnatcatcher</i>	1	---	1	0
<i>Unidentified Raptor</i>	1	---	1	0
<i>Unidentified Vireo</i>	1	---	1	0
Total	258	320	578	100

Note: New species that have not previously been verified for the park are shown in bold and shaded. Species are listed in rank order of detection, from the most to least commonly observed. Relative detectability among species has not been taken into account; thus, rank order provides only a general indication of relative abundance. Detectability will be explicitly accounted for in periodic synthesis reports. Because of the potential to confound future comparisons, these values exclude observations of species flying overhead/not using the habitat. Species noted as incidental were identified by our birding team, but not as part of our regular survey.

3.5 Gila Cliff Dwellings National Monument

3.5.1 2012 sampling

During May of 2012, we sampled two transects/grids at Gila Cliff Dwellings NM (Figure 3.5.1). One transect, with seven points, was in the riparian habitat class, and the other transect, with six points, was in the upland habitat class (woodland habitat type; Table 3.5.1). Each transect was visited twice for a total of 26 point counts at the park.

3.5.2 Results and discussion

During 2012, 450 birds of 62 species were counted at Gila Cliff Dwellings NM (Table 3.5.2). Mourning Dove had the highest number of individuals counted (10% of the total number of birds counted). Other species counted in relatively high numbers included Spotted Towhee (9%), American Robin (7%), Violet-green Swallow (5%), Black-headed Grosbeak (4%), and Cassin's Kingbird (4%).

The following discussion is based on observations of the field crew and includes information of interest to the park that is not restricted to data collected during surveys.

The Miller Fire of May 2011 burned most sections of the park. Although the upland transect was moderately burned, the riparian transect was the most affected; some sections of the gallery forest and adjacent upland were completely charred, and no undergrowth remained. Riparian species like Common Yellowthroat, Song Sparrow, Abert's Towhee, Yellow Warbler, and Yellow-breasted Chat were counted in lower numbers in 2012, but cavity nesters like Purple Martin, Violet-green Swallow, and Red-naped Sapsucker were more numerous in the open areas. Common Black-Hawk and Common Merganser were seen in suitable nesting habitat, the Great Blue Heron rookery had fewer nests than previous years, and hummingbird numbers were higher, with Broad-tailed outnumbering Black-chinned. Spotted Towhee, Bewick's Wren, Plumbeous Vireo, Bushtit, Hepatic Tanager, Grace's Warbler, and White-breasted Nuthatch were numerous in different habitats. A single American Goldfinch detected on the riparian transect was a rarity for the area and a new species for the park. Two additional species, Pine Siskin and Ruby-crowned Kinglet, were recorded for the first time in 2012.



ROB BENNETTS

One Great Horned Owl (*Bubo virginianus*) was observed at Gila Cliff Dwellings NM in 2012.

Table 3.5.1. Habitat type, number of points, and sampling dates for each transect or grid, Gila Cliff Dwellings NM, 2012

Transect/Grid	Habitat class	Habitat type	# points	# visits	Visit 1	Visit 2
RIP	Riparian	Riparian	7	2	5/4/2012	5/5/2012
Up	Upland	Woodland	6	2	5/4/2012	5/5/2012

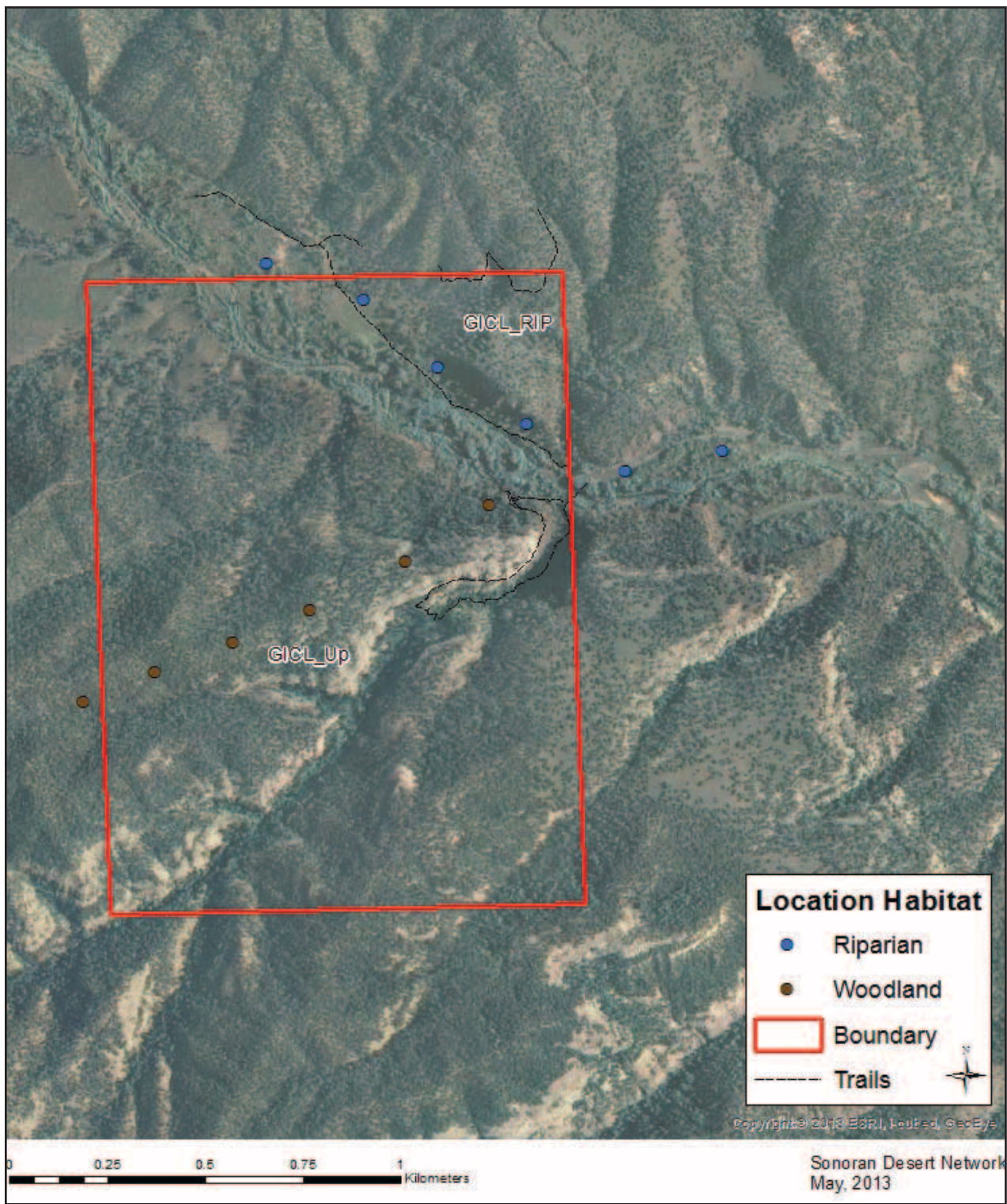


Figure 3.5.1. Point locations targeted for annual sampling at Gila Cliff Dwellings NM.

Table 3.5.2. Number of birds counted of each species in each habitat type, Gila Cliff Dwellings NM, 2012

Species	Habitat type		# of birds counted	
	Riparian	Woodland	Total	% of total
Mourning Dove	23	22	45	10
Spotted Towhee	36	5	41	9
American Robin	31	2	33	7
Violet-green Swallow	19	2	21	5
Black-headed Grosbeak	12	8	20	4
Cassin's Kingbird	16	---	16	4
Chipping Sparrow	14	---	14	3
Common Raven	3	11	14	3
House Finch	7	6	13	3
House Wren	9	3	12	3
Ash-throated Flycatcher	3	8	11	2
Purple Martin	10	---	10	2
Pine Siskin	2	8	10	2
Wild Turkey	1	9	10	2
Warbling Vireo	7	2	9	2
Hepatic Tanager	3	6	9	2
Black-throated Gray Warbler	---	9	9	2
Western Scrub-Jay	4	3	7	2
Broad-tailed Hummingbird	2	5	7	2
Hairy Woodpecker	2	5	7	2
Steller's Jay	2	5	7	2
Northern Flicker	4	2	6	1
Turkey Vulture	3	3	6	1
Bushtit	---	6	6	1
Canyon Towhee	5	---	5	1
Yellow-breasted Chat	4	1	5	1
Gray Flycatcher	2	3	5	1
Black Phoebe	4	---	4	1
Common Yellowthroat	3	1	4	1
Painted Redstart	3	1	4	1
White-breasted Nuthatch	2	2	4	1
White-winged Dove	---	4	4	1
Hermit Thrush	3	---	3	1
Lark Sparrow	3	---	3	1
Northern Mockingbird	3	---	3	1
Wilson's Warbler	3	---	3	1
Killdeer	2	1	3	1
Yellow Warbler	2	1	3	1
Bewick's Wren	1	2	3	1
Yellow-rumped Warbler	1	2	3	1

Table 3.5.2. Number of birds counted of each species in each habitat type, Gila Cliff Dwellings NM, 2012, cont.

Species	Habitat type		# of birds counted	
	Riparian	Woodland	Total	% of total
Acorn Woodpecker	2	---	2	0
Grace's Warbler	2	---	2	0
Green-tailed Towhee	2	---	2	0
Red-naped Sapsucker	2	---	2	0
Western Kingbird	2	---	2	0
Plumbeous Vireo	1	1	2	0
Pygmy Nuthatch	---	2	2	0
Ruby-crowned Kinglet	---	2	2	0
American Goldfinch	1	---	1	0
Canyon Wren	1	---	1	0
Common Merganser	1	---	1	0
Juniper Titmouse	1	---	1	0
Rufous-crowned Sparrow	1	---	1	0
Say's Phoebe	1	---	1	0
Virginia's Warbler	1	---	1	0
Cooper's Hawk	---	1	1	0
Great Horned Owl	---	1	1	0
Mountain Chickadee	---	1	1	0
Orange-crowned Warbler	---	1	1	0
Western Tanager	---	1	1	0
Western Wood-Pewee	---	1	1	0
Zone-tailed Hawk	---	1	1	0
<i>Unidentified Bird</i>	---	7	7	2
<i>Unidentified Vireo</i>	---	5	5	1
<i>Unidentified Flycatcher</i>	---	3	3	1
<i>Unidentified Empidonax</i>	---	1	1	0
<i>Unidentified Swallow</i>	---	1	1	0
<i>Unidentified Woodpecker</i>	---	1	1	0
Total	272	178	450	100

Note: New species that have not previously been verified for the park are shown in bold and shaded. Species are listed in rank order of detection, from the most to least commonly observed. Relative detectability among species has not been taken into account; thus, rank order provides only a general indication of relative abundance. Detectability will be explicitly accounted for in periodic synthesis reports. Because of the potential to confound future comparisons, these values exclude observations of species flying overhead/not using the habitat. Species noted as incidental were identified by our birding team, but not as part of our regular survey.

3.6 Montezuma Castle National Monument

3.6.1 2012 sampling

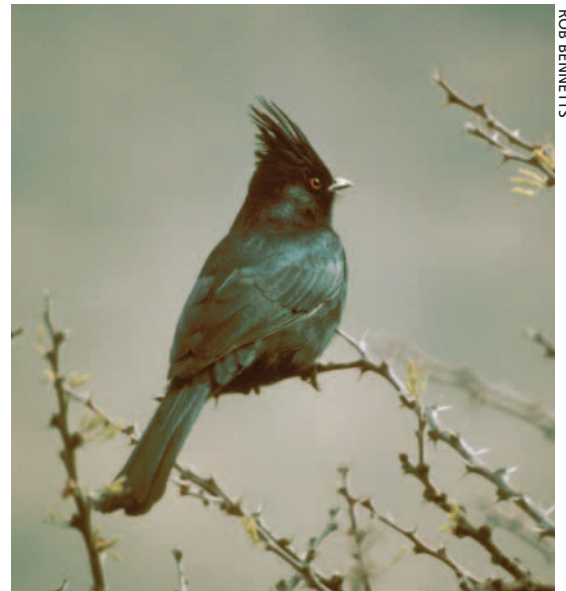
During May of 2012, we sampled four transects/grids at Montezuma Castle NM (Figures 3.6.1-1 and 3.6.1-2). Three transects were located at the Castle Unit: two in riparian habitat and one in upland desert scrub. Six points were sampled on the riparian transects and eight points were sampled on the upland desert scrub transect. The one transect at the Well Unit, with seven points, was in riparian habitat. Each point was surveyed twice for a total of 54 point counts at Montezuma Castle NM (Table 3.6.1).

3.6.2 Results and discussion

During 2012, 1,149 birds of 77 species were counted at Montezuma Castle NM (Tables 3.6.2-1 and 3.6.2-2). Overall, House Finch had the highest number of individuals counted, followed by Mourning Dove and Lucy's Warbler. At the Castle Unit, House Finch had the highest number of individuals counted (8% of the total number of birds counted at the Castle Unit), followed by Phainopepla (7%), Mourning Dove (6%), Lucy's Warbler (6%), and Gila Woodpecker (6%). At the Well Unit, Brown-crested Flycatcher had the highest number of individuals counted (8%), followed by Lucy's Warbler (8%), Mourning Dove (8%), Yellow Warbler (7%), and House Finch (6%). There was one new addition to the park list in 2012— Hermit Warbler, observed at the Castle Unit.

The following discussion is based on observations of the field crew and includes information of interest to the park that is not restricted to data collected during surveys.

The lush riparian transects continued to host good numbers of breeders like Hooded Oriole, Summer Tanager, Brown-crested Flycatcher, Song Sparrow, Bewick's Wren, Yellow-breasted



ROB BENNETTS

Phainopepla (*Phainopepla nitens*) had a relatively high number of individuals counted at the Castle Unit in 2012.

Chat, House Finch, and Yellow Warbler. Four pairs of Common Black-Hawk were occupying nest sites used last year, and Blue Grosbeak, Lesser Goldfinch, and Lucy's Warbler were also detected in good numbers. Eurasian Collared-Dove was more numerous in the residential areas just outside the park (at the Well Unit), and as numbers outside the park have increased they are more likely to be observed on transects in future seasons. On the upland transects, Black-tailed Gnatcatcher, Verdin, Canyon Towhee, and Black-throated Sparrow seemed more numerous than previous years, and the wastewater ponds at the park had Killdeer and Wood Duck with young, indicating breeding within the park. A Great Egret was also present.

Most notable were a pair of nesting Peregrine Falcons on the cliffs next to the castle ruins, a rare breeder in the area and not recorded in the park in recent years, and a Northern Beardless-Tyrannulet, a neotropical flycatcher expanding further north from its breeding range in southern Arizona.

Table 3.6.1. Habitat type, number of points, and sampling dates for each transect or grid, Montezuma Castle NM, 2012

Transect/Grid	Habitat class	Habitat type	# points	# visits	Visit 1	Visit 2
R1 (Castle Unit)	Riparian	Riparian	6	2	5/17/2012	5/25/2012
R2 (Castle Unit)	Riparian	Riparian	6	2	5/17/2012	5/25/2012
Up1 (Castle Unit)	Upland	Desert scrub	8	2	5/18/2012	5/26/2012
R (Well Unit)	Riparian	Riparian	7	2	5/18/2012	5/26/2012



Figure 3.6.1-1. Point locations targeted for annual sampling at Montezuma Castle NM, Castle Unit.

Table 3.6.2-1. Number of birds counted of each species in each habitat type, Montezuma Castle NM–Castle Unit, 2012

Species	Habitat type		# of birds counted	
	Desert scrub	Riparian	Total	% of total
House Finch	34	37	71	8
Phainopepla	29	34	63	7
Mourning Dove	19	38	57	6
Lucy's Warbler	16	39	55	6
Gila Woodpecker	16	37	53	6
Ash-throated Flycatcher	15	25	40	4
Violet-green Swallow	27	12	39	4
Brown-crested Flycatcher	10	27	37	4
Bewick's Wren	5	27	32	4
Summer Tanager	5	19	24	3
Blue Grosbeak	8	15	23	3
Brown-headed Cowbird	7	16	23	3
Gambel's Quail	11	10	21	2
Yellow-breasted Chat	5	15	20	2
Lesser Goldfinch	10	9	19	2
Abert's Towhee	4	14	18	2
Yellow Warbler	3	13	16	2
Western Kingbird	6	8	14	2
Verdin	4	9	13	1
Ladder-backed Woodpecker	5	7	12	1
Turkey Vulture	11	---	11	1
Black-throated Sparrow	10	1	11	1
Bullock's Oriole	4	7	11	1
Wilson's Warbler	3	8	11	1
White-throated Swift	3	7	10	1
Northern Mockingbird	9	---	9	1
Warbling Vireo	6	2	8	1
Western Wood-Pewee	4	4	8	1
Cliff Swallow	2	6	8	1
Cassin's Kingbird	1	7	8	1
Northern Rough-winged Swallow	1	7	8	1
Common Raven	5	2	7	1
Bridled Titmouse	3	4	7	1
Black-chinned Hummingbird	1	6	7	1
Indigo Bunting	1	6	7	1
Common Yellowthroat	---	7	7	1
Hooded Oriole	2	4	6	1
Red-winged Blackbird	---	6	6	1
Chipping Sparrow	3	2	5	1
Song Sparrow	1	4	5	1

Table 3.6.2-1. Number of birds counted of each species in each habitat type, Montezuma Castle NM–Castle Unit, 2012, cont.

Species	Habitat type		# of birds counted	
	Desert scrub	Riparian	Total	% of total
Yellow-rumped Warbler	---	5	5	1
Black-tailed Gnatcatcher	4	---	4	0
Black-headed Grosbeak	3	1	4	0
Canyon Wren	2	2	4	0
Bell's Vireo	1	3	4	0
Peregrine Falcon	1	3	4	0
Red-tailed Hawk	1	3	4	0
Belted Kingfisher	---	4	4	0
Canyon Towhee	1	2	3	0
Northern Cardinal	---	3	3	0
Scott's Oriole	2	---	2	0
Anna's Hummingbird	1	1	2	0
Common Black-Hawk	1	1	2	0
Mallard	1	1	2	0
Rock Wren	1	1	2	0
Bushtit	---	2	2	0
Great Blue Heron	---	2	2	0
Lazuli Bunting	---	2	2	0
Northern Flicker	---	2	2	0
Western Tanager	---	2	2	0
Wood Duck	---	2	2	0
Crissal Thrasher	1	---	1	0
Rufous-crowned Sparrow	1	---	1	0
Barn Swallow	---	1	1	0
Dusky-capped Flycatcher	---	1	1	0
Gray Flycatcher	---	1	1	0
Great Egret	---	1	1	0
Great Horned Owl	---	1	1	0
Hermit Warbler	---	1	1	0
Lincoln's Sparrow	---	1	1	0
MacGillivray's Warbler	---	1	1	0
Northern Beardless-Tyrannulet	---	1	1	0
Say's Phoebe	---	1	1	0
Spotted Towhee	---	1	1	0
White-winged Dove	---	1	---	0
<i>Unidentified Bird</i>	8	6	14	2
<i>Unidentified Myiarchus</i>	2	---	2	0
<i>Unidentified Hummingbird</i>	1	---	1	0
<i>Unidentified Flycatcher</i>	---	1	1	0
<i>Unidentified Swallow</i>	---	1	1	0

Species	Habitat type		# of birds counted	
	Desert scrub	Riparian	Total	% of total
<i>Unidentified Woodpecker</i>	---	1	1	0
Total	341	564	905	100%

Note: New species that have not previously been verified for the park are shown in bold and shaded. Species are listed in rank order of detection, from the most to least commonly observed. Relative detectability among species has not been taken into account; thus, rank order provides only a general indication of relative abundance. Detectability will be explicitly accounted for in periodic synthesis reports. Because of the potential to confound future comparisons, these values exclude observations of species flying overhead/not using the habitat. Species noted as incidental were identified by our birding team, but not as part of our regular survey.



© ROBERT SHANTZ

Summer Tanager (*Piranga rubra*) was counted in both desert scrub and riparian habitat at both park units in 2012.



Figure 3.6.1-2. Point locations targeted for annual sampling at Montezuma Castle NM, Well Unit.

Table 3.6.2-2. Number of birds counted in riparian habitat, Montezuma Castle NM–Well Unit, 2012

Species	# of birds counted		Species	# of birds counted	
	Total (riparian habitat)	% of total		Total (riparian habitat)	% of total
Brown-crested Flycatcher	20	8	Ladder-backed Woodpecker	3	1
Lucy's Warbler	19	8	Phainopepla	3	1
Mourning Dove	19	8	Ash-throated Flycatcher	2	1
Yellow Warbler	16	7	Blue Grosbeak	2	1
House Finch	14	6	Lazuli Bunting	2	1
Summer Tanager	13	5	Warbling Vireo	2	1
Brown-headed Cowbird	12	5	Bell's Vireo	1	0
Gila Woodpecker	12	5	Black-headed Grosbeak	1	0
Yellow-breasted Chat	12	5	Broad-tailed Hummingbird	1	0
Abert's Towhee	10	4	Canyon Wren	1	0
Song Sparrow	10	4	Gray Flycatcher	1	0
Bridled Titmouse	8	3	Hooded Oriole	1	0
Black-chinned Hummingbird	7	3	Verdin	1	0
Bullock's Oriole	7	3	Western Tanager	1	0
Lesser Goldfinch	7	3	Total	244	100%
Violet-green Swallow	6	2			
Bewick's Wren	5	2			
Western Wood-Pewee	5	2			
Black Phoebe	4	2			
Common Black-Hawk	4	2			
Common Yellowthroat	4	2			
Northern Cardinal	4	2			
Northern Rough-winged Swallow	4	2			

Note: New species that have not previously been verified for the park are shown in bold and shaded. Species are listed in rank order of detection, from the most to least commonly observed. Relative detectability among species has not been taken into account; thus, rank order provides only a general indication of relative abundance. Detectability will be explicitly accounted for in periodic synthesis reports. Because of the potential to confound future comparisons, these values exclude observations of species flying overhead/not using the habitat. Species noted as incidental were identified by our birding team, but not as part of our regular survey.

3.7 Organ Pipe Cactus National Monument

3.7.1 2012 sampling

During April of 2012, we sampled six transects/grids, each with seven points, at Organ Pipe Cactus NM (Figure 3.7.1). All transects were sampled two times, for a total of 84 point counts during 2012. Two transects were in riparian (xeroriparian) habitats and four were in upland (desert scrub) habitats (Table 3.7.1).

3.7.2 Results and discussion

During 2012, 1,315 birds of 63 species were counted at Organ Pipe Cactus NM (Table 3.7.2). Mourning Dove had the highest number of individuals counted (13% of the total number of birds counted). The next species observed in relatively high numbers were Gila Woodpecker (11%), Gambel’s Quail (9%), Brewer’s Sparrow (8%), Phainopepla (6%), and Ash-throated Flycatcher (6%). No new species were detected for the park during the surveys.

The following discussion is based on observations of the field crew and includes information of interest to the park that is not restricted to data collected during surveys.

Common desert residents like Gila Woodpecker, Gilded Flicker, Verdin, Curve-billed Thrasher, Cactus Wren, and Black-throated Sparrow with juveniles were prominent following their early spring breeding season. Migrant breeders like Lucy’s Warbler, White-winged Dove, Scott’s Oriole, and Ash-throated Flycatcher were more numerous than last year. The desert washes with larger riparian trees and the visitor center pond attracted interesting migrant species like Hermit Warbler, Lincoln’s Sparrow, American Robin, Lazuli Bunting, Nashville Warbler, Hammond’s Flycatcher and a Great Egret feasting on a pupfish.



ROB BENNETTS

Curve-billed Thrasher (*Toxostoma curvirostre*), a desert resident, was observed in relatively high numbers in 2012 (seventh species on the list).

Nocturnal species included Elf, Western Screech, and Great Horned Owls and Common Poorwill.

Observation highlights included a territorial and possibly breeding Ferruginous Pygmy-Owl— a rare and endangered species not recorded every year. It may have been the same individual from last year, holding the same territory; the park biologist had been monitoring its movements. Peregrine Falcon, a rare breeder in the park was also detected on the surveys. We had a strange incidental observation of three female Mallard ducks sitting on the paved main highway at dawn; they were apparently disoriented as they repeatedly circled the sparse desert and landed on the road several times. The closest suitable habitat for them would have been Quitobaquito Springs, 35 miles southwest.

Table 3.7.1. Habitat type, number of points, and sampling dates for each transect or grid, Organ Pipe Cactus NM, 2012

Transect/Grid	Habitat class	Habitat type	# points	# visits	Visit 1	Visit 2
R1	Riparian	Xeroriparian	7	2	4/5/2012	4/19/2012
R2	Riparian	Xeroriparian	7	2	4/6/2012	4/20/2012
U1	Upland	Desert scrub	7	2	4/7/2012	4/21/2012
U12	Upland	Desert scrub	7	2	4/5/2012	4/19/2012
U4	Upland	Desert scrub	7	2	4/6/2012	4/20/2012
U5	Upland	Desert scrub	7	2	4/7/2012	4/21/2012

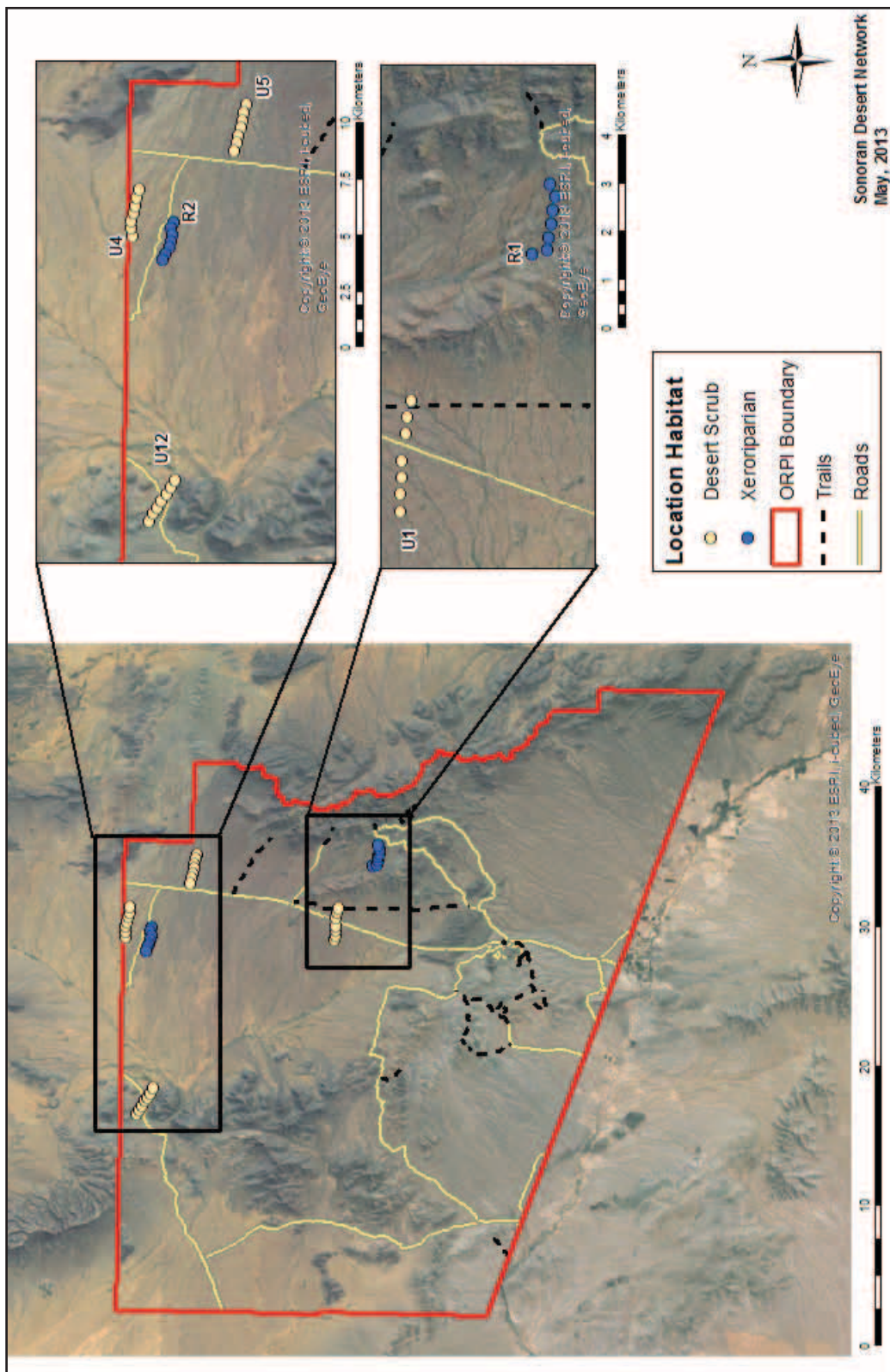


Figure 3.7.1. Point locations targeted for annual sampling at Organ Pipe Cactus NM.

Table 3.7.2. Number of birds counted of each species in each habitat type, Organ Pipe Cactus NM, 2012

Species	Habitat type		# of birds counted	
	Desert scrub	Xeroriparian	Total	% of total
Mourning Dove	99	73	172	13
Gila Woodpecker	98	41	139	11
Gambel's Quail	76	45	121	9
Brewer's Sparrow	31	72	103	8
Phainopepla	48	37	85	6
Ash-throated Flycatcher	64	17	81	6
Curve-billed Thrasher	31	30	61	5
Cactus Wren	33	25	58	4
White-winged Dove	35	16	51	4
Verdin	32	17	49	4
Black-throated Sparrow	33	6	39	3
Black-tailed Gnatcatcher	27	11	38	3
House Finch	19	19	38	3
Scott's Oriole	23	7	30	2
Northern Mockingbird	9	16	25	2
Gilded Flicker	15	9	24	2
White-crowned Sparrow	2	15	17	1
Canyon Towhee	4	10	14	1
Loggerhead Shrike	11	1	12	1
Ladder-backed Woodpecker	7	2	9	1
Red-tailed Hawk	7	2	9	1
Lucy's Warbler	4	3	7	1
Wilson's Warbler	3	3	6	0
Common Raven	2	4	6	0
Nashville Warbler	4	1	5	0
Costa's Hummingbird	3	2	5	0
Orange-crowned Warbler	3	2	5	0
Violet-green Swallow	---	5	5	0
Turkey Vulture	4	---	4	0
Chipping Sparrow	3	---	3	0
Black-chinned Hummingbird	2	1	3	0
Yellow-rumped Warbler	2	1	3	0
Black-throated Gray Warbler	1	2	3	0
Green-tailed Towhee	1	2	3	0
Western Kingbird	1	2	3	0
Gray Flycatcher	---	3	3	0
Harris's Hawk	---	3	3	0
Black-headed Grosbeak	2	---	2	0
Brown-crested Flycatcher	2	---	2	0
Greater Roadrunner	2	---	2	0

Table 3.7.2. Number of birds counted of each species in each habitat type, Organ Pipe Cactus NM, 2012, cont.

Species	Habitat type		# of birds counted	
	Desert scrub	Xeroriparian	Total	% of total
MacGillivray's Warbler	2	---	2	0
Anna's Hummingbird	1	1	2	0
Blue-gray Gnatcatcher	1	1	2	0
Bullock's Oriole	1	1	2	0
Virginia's Warbler	1	1	2	0
Lark Bunting	---	2	2	0
Pyrrhuloxia	---	2	2	0
American Kestrel	1	---	1	0
Cassin's Kingbird	1	---	1	0
Lazuli Bunting	1	---	1	0
Lesser Goldfinch	1	---	1	0
Lesser Nighthawk	1	---	1	0
Pacific-slope Flycatcher	1	---	1	0
Peregrine Falcon	1	---	1	0
Rock Wren	1	---	1	0
Rufous Hummingbird	1	---	1	0
Swainson's Hawk	1	---	1	0
Townsend's Warbler	1	---	1	0
Bronzed Cowbird	---	1	1	0
Crissal Thrasher	---	1	1	0
Ferruginous Pygmy-Owl	---	1	1	0
Hammond's Flycatcher	---	1	1	0
Spotted Towhee	---	1	1	0
<i>Unidentified Bird</i>	10	3	13	1
<i>Unidentified Hummingbird</i>	1	8	9	1
<i>Unidentified Flicker</i>	6	---	6	0
<i>Unidentified Thrasher</i>	3	---	3	0
<i>Unidentified Myiarchus</i>	1	1	2	0
<i>Unidentified raptor</i>	1	---	1	0
<i>Unidentified Sparrow</i>	1	---	1	0
<i>Unidentified Oriole</i>	---	1	1	0
<i>Unidentified Woodpecker</i>	---	1	1	0
Total	783	532	1,315	100%

Note: New species that have not previously been verified for the park are shown in bold and shaded. Species are listed in rank order of detection, from the most to least commonly observed. Relative detectability among species has not been taken into account; thus, rank order provides only a general indication of relative abundance. Detectability will be explicitly accounted for in periodic synthesis reports. Because of the potential to confound future comparisons, these values exclude observations of species flying overhead/not using the habitat. Species noted as incidental were identified by our birding team, but not as part of our regular survey.

3.8 Saguaro National Park

3.8.1 2012 sampling

During April, May, and June of 2012, we sampled 17 transects or grids at Saguaro NP (Figures 3.8.1-1 and 3.8.1-2). Twelve transects were in the Rincon Mountain District (SAGE) and five were in the Tucson Mountain District (SAGW). Of those in the Rincon Mountain District, 11 were in the upland habitat class (desert scrub, forest, or woodland habitat types), and one was in the riparian habitat class (Table 3.8.1). The five transects in the Tucson Mountain District were in upland desert scrub habitat. All transects/grids at the park had five to eight points each, and all but four were visited twice. The total number of point counts at Saguaro NP in 2012 was 197.

3.8.2 Results and discussion

During 2012, 3,178 birds of 111 species were counted at Saguaro NP (Tables 3.8.2-1 and 3.8.2-2). Overall, Gila Woodpecker had the highest number of individuals counted, followed by Cactus Wren and Gambel's Quail. At the Rincon Mountain District (SAGE), 1,954 birds of 106 species were counted. Species counted in the highest numbers were White-winged Dove (7%), Gila Woodpecker (6%), Ash-throated Flycatcher (5%), and Gambel's Quail (5%). At the Tucson Mountain District (SAGW), 1,224 birds of 46 species were counted. Species counted in the highest numbers were Gila Woodpecker (18%), Cactus Wren (9%), Gambel's Quail (8%), and Curve-billed Thrasher (7%).

No new species were detected for the park during the surveys. However, note that Eurasian Collared-Dove, which was recorded in 2012, was recorded for the first time in 2011 (but mistakenly not reported as a new species for the park last year).

The following discussion is based on observations of the field crew and includes information of interest to the park that is not restricted to data collected during surveys.

Resident upland desert breeders like Gila Woodpecker, Cactus Wren, Curve-billed Thrasher, Gambel's Quail, Black-throated Sparrow and Verdin were again recorded in high numbers, and their juveniles and immatures were numerous, indicating a good early spring breeding season. Costa's Hummingbird, Gilded Flicker, Canyon Towhee, Rufous-winged Sparrow and Pyrrhuloxia were also well represented. Neotropical migrant breeders including White-winged Dove, Ash-throated Flycatcher, Black-chinned Hummingbird, Lucy's Warbler, Bell's Vireo, and Scott's Oriole were widespread at both park units, and the lush upland desert habitat again proved to be the most preferred by Gray Vireo, a rare and poorly known species in spring migration with only a few records in southern Arizona. Very unusual were eight singing Cassin's Sparrows at SAGE along the Cactus Forest Loop during the pre-season training in late March, quite notable as they are rare in winter/early spring and are non-vocal; there may have been more present. They were also detected on surveys in early April, and a migrant Peregrine Falcon was recorded as an incidental observation.



© ROBERT SHANTZ

Gambel's Quail (*Callipepla gambelii*) were recorded on desert scrub, woodland, and riparian transects at Saguaro NP in 2012.

Table 3.8.1. Habitat type, number of points, and sampling dates for each transect or grid, Saguaro NP, 2012

Transect/Grid	Habitat class	Habitat type	#points	# visits	Visit 1	Visit 2
SAGE-008	Upland	Desert scrub	7	1	4/25/2012	--
SAGE-112	Upland	Desert scrub	7	2	4/9/2012	4/24/2012
SAGE-113	Upland	Forest	7	2	5/17/2012	6/14/2012
SAGE-115	Upland	Desert scrub	7	2	4/10/2012	4/23/2012
SAGE-125	Upland	Desert scrub	5	1	5/18/2012	—
SAGE-126	Upland	Desert scrub	6	2	5/18/2012	6/15/2012
SAGE-127	Upland	Desert scrub	6	1	6/15/2012	--
SAGE-139	Upland	Desert scrub	6	2	4/10/2012	4/24/2012
SAGE-191	Upland	Forest	7 ¹	2	5/17/2012	6/14/2012
SAGE-403	Upland	Woodland	6	2	5/16/2012	6/13/2012
SAGE-405	Upland	Woodland	6	2	5/16/2012	6/13/2012
SAGE-LRC	Riparian	Riparian	8	1	4/25/2012	--
SAGW-204	Upland	Desert scrub	7	2	4/4/2012	4/17/2012
SAGW-212	Upland	Desert scrub	6	2	4/3/2012	4/16/2012
SAGW-213	Upland	Desert scrub	7	2	4/4/2012	4/17/2012
SAGW-238	Upland	Desert scrub	6	2	4/2/2012	4/18/2012
SAGW-239	Upland	Desert scrub	8	2	4/3/2012	4/16/2012

At SAGE-191, 7 points were sampled on one visit, and 6 on the other.

At the Rincon Creek transect at SAGE, the creek level was good following the winter rains, and the riparian corridor was in better shape than last season. Resident Northern Cardinal, Abert's Towhee, House Finch, Gambel's Quail, Rufous-winged Sparrow, Lesser Goldfinch, and Bewick's Wren were counted in good numbers, and migrant breeders including Lucy's Warbler, Broad-billed Hummingbird, Vermilion Flycatcher, Cassin's Kingbird, Ash-throated Flycatcher, and White-winged Dove seemed more numerous. Bronzed Cowbird, Common Ground-Dove, Brown-crested Flycatcher, and Purple Martin were fewer last season, and breeding Red-tailed Hawk, Gray Hawk, Zone-tailed Hawk, and Great Horned Owl were breeding at the same territories as last year.

At the high elevation transects in the Rincon Mountains at SAGE, one new transect was established at Grass Shack campground, and two new transects were added at Douglas Spring campground. This now completes a full set of six transects at three different sites, elevations,

and habitats, for a safe and reliable sampling route of the backpacking surveys in the rugged mountains. The two transects established near Douglas Springs were placed in desert shrub habitat. Commonly detected species included Ash-throated Flycatcher, Bewick's Wren, Scott's Oriole, Gambel's Quail, Blue-gray Gnatcatcher, Rufous-crowned Sparrow, and Bushtit. Near Grass Shack, Bewick's Wren, Ash-Throated Flycatcher, Rufous-crowned Sparrow, Blue-gray Gnatcatcher, and Canyon Towhee were recorded in similar numbers as last year, but far fewer Black-throated Gray Warblers and Mexican Jays were observed this year. A Broad-tailed Hummingbird nest with nestlings was found next to the Grass Shack campsite. There was a lot of bird activity around Manning Camp this year, with Yellow-eyed Junco, House Wren, Steller's Jay, Grace's Warbler, Spotted Towhee, Western Tanager, and American Robin being the most commonly observed. Also of note, a male Cassin's Finch was observed singing near Manning Camp, which is quite uncommon.

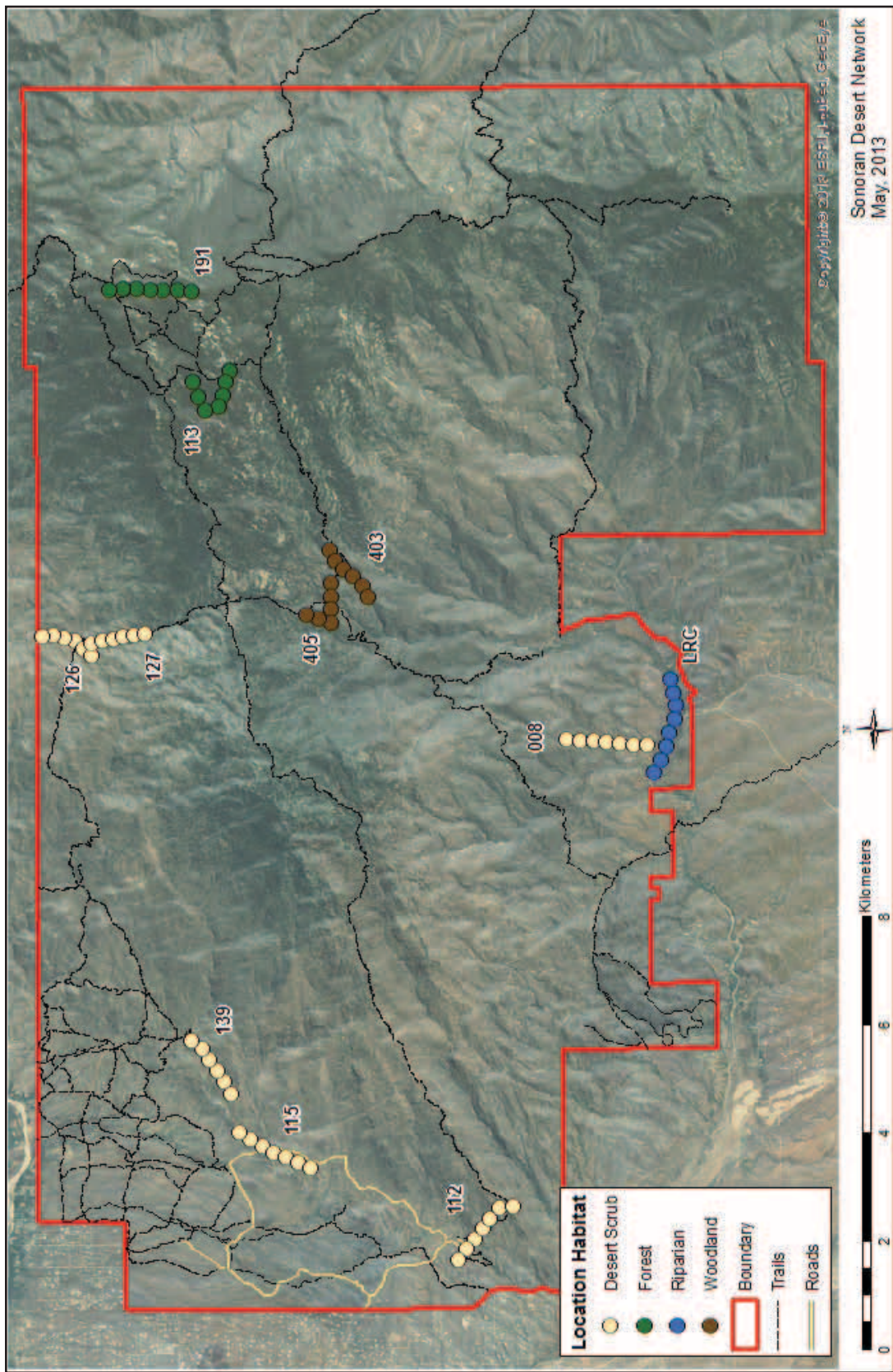


Figure 3.8.1-1. Point locations targeted for annual sampling at Saguaro NP, Rincon Mountain District (SAGE).

Table 3.8.2-1. Number of birds counted of each species in each habitat type, Saguaro NP–Rincon Mountain District (SAGE), 2012

Species	Habitat type				# of birds counted	
	Desert scrub	Forest	Riparian	Woodland	Total	% of total
White-winged Dove	113	---	24	6	143	7
Gila Woodpecker	96	---	24	---	120	6
Ash-throated Flycatcher	61	---	12	30	103	5
Gambel's Quail	63	---	24	10	97	5
Cactus Wren	88	---	6	---	94	5
Mourning Dove	41	---	21	10	72	4
Bewick's Wren	15	---	4	47	66	3
Canyon Towhee	42	---	1	13	56	3
Black-throated Sparrow	53	---	---	---	53	3
Spotted Towhee	9	23	---	15	47	2
Brewer's Sparrow	44	---	---	---	44	2
Rufous-crowned Sparrow	17	---	---	26	43	2
Blue-gray Gnatcatcher	17	2	---	23	42	2
Yellow-eyed Junco	---	41	---	---	41	2
Pyrrhuloxia	40	---	---	---	40	2
Scott's Oriole	30	---	---	6	36	2
Curve-billed Thrasher	29	---	5	---	34	2
Verdin	22	---	10	---	32	2
House Wren	---	31	---	---	31	2
Steller's Jay	---	29	---	---	29	1
White-crowned Sparrow	27	---	---	---	27	1
Brown-crested Flycatcher	11	---	8	5	24	1
Grace's Warbler	---	24	---	---	24	1
Bushtit	16	---	---	7	23	1
House Finch	18	---	4	---	22	1
Lucy's Warbler	2	---	20	---	22	1
Rock Wren	19	1	---	1	21	1
Yellow-rumped Warbler	4	15	1	---	20	1
Western Tanager	---	19	---	---	19	1
American Robin	---	18	---	---	18	1
Gilded Flicker	14	---	2	---	16	1
Rufous-winged Sparrow	7	---	9	---	16	1
Northern Cardinal	1	---	15	---	16	1
Ladder-backed Woodpecker	10	---	3	2	15	1
Lesser Goldfinch	8	---	3	4	15	1
Hepatic Tanager	4	9	---	2	15	1
White-breasted Nuthatch	---	15	---	---	15	1
Green-tailed Towhee	12	---	2	---	14	1
Phainopepla	11	---	---	3	14	1
Northern Flicker	---	14	---	---	14	1
Pygmy Nuthatch	---	14	---	---	14	1

Table 3.8.2-1. Number of birds counted of each species in each habitat type, Saguaro NP–Rincon Mountain District, 2012, cont.

Species	Habitat type				# of birds counted	
	Desert scrub	Forest	Riparian	Woodland	Total	% of total
Black-chinned Sparrow	7	---	---	6	13	1
Hermit Thrush	---	13	---	---	13	1
Plumbeous Vireo	---	11	---	---	11	1
Mexican Jay	---	---	---	11	11	1
Black-tailed Gnatcatcher	8	---	---	2	10	1
Western Scrub-Jay	8	---	---	2	10	1
Violet-green Swallow	---	10	---	---	10	1
Broad-tailed Hummingbird	2	5	---	2	9	0
Greater Pewee	---	9	---	---	9	0
Black-throated Gray Warbler	---	1	---	8	9	0
Northern Mockingbird	8	---	---	---	8	0
Crissal Thrasher	4	---	---	4	8	0
Western Wood-Pewee	1	7	---	---	8	0
Cordilleran Flycatcher	---	8	---	---	8	0
Red-faced Warbler	---	8	---	---	8	0
Anna's Hummingbird	7	---	---	---	7	0
Great Horned Owl	3	---	4	---	7	0
Black-headed Grosbeak	2	4	---	1	7	0
Mountain Chickadee	---	7	---	---	7	0
Bell's Vireo	---	---	7	---	7	0
Chipping Sparrow	6	---	---	---	6	0
Lazuli Bunting	4	---	2	---	6	0
Acorn Woodpecker	---	3	---	3	6	0
Virginia's Warbler	2	2	1	---	5	0
Gray Flycatcher	2	---	3	---	5	0
Bridled Titmouse	2	---	---	3	5	0
Brown-headed Cowbird	1	---	3	1	5	0
Wild Turkey	---	5	---	---	5	0
Greater Roadrunner	2	---	2	---	4	0
Red-tailed Hawk	2	---	1	1	4	0
Canyon Wren	1	---	---	3	4	0
Hairy Woodpecker	---	4	---	---	4	0
Olive Warbler	---	4	---	---	4	0
Summer Tanager	---	---	4	---	4	0
Western Kingbird	1	---	2	---	3	0
Broad-billed Hummingbird	1	---	---	2	3	0
Vermilion Flycatcher	---	---	3	---	3	0
Cassin's Kingbird	---	---	2	1	3	0
Bullock's Oriole	2	---	---	---	2	0
Costa's Hummingbird	2	---	---	---	2	0
Orange-crowned Warbler	2	---	---	---	2	0

Table 3.8.2-1. Number of birds counted of each species in each habitat type, Saguaro NP–Rincon Mountain District, 2012, cont.

Species	Habitat type				# of birds counted	
	Desert scrub	Forest	Riparian	Woodland	Total	% of total
Abert's Towhee	1	---	1	---	2	0
Wilson's Warbler	1	---	1	---	2	0
Lark Sparrow	---	---	2	---	2	0
Black Phoebe	---	---	---	2	2	0
Cooper's Hawk	---	---	---	2	2	0
Cassin's Sparrow	1	---	---	---	1	0
Common Raven	1	---	---	---	1	0
Gray Vireo	1	---	---	---	1	0
Hooded Oriole	1	---	---	---	1	0
Nashville Warbler	1	---	---	---	1	0
Olive-sided Flycatcher	1	---	---	---	1	0
Warbling Vireo	1	---	---	---	1	0
Band-tailed Pigeon	---	1	---	---	1	0
Brown Creeper	---	1	---	---	1	0
Dusky-capped Flycatcher	---	1	---	---	1	0
Painted Redstart	---	1	---	---	1	0
Red-breasted Nuthatch	---	1	---	---	1	0
Western Bluebird	---	1	---	---	1	0
MacGillivray's Warbler	---	---	1	---	1	0
Yellow Warbler	---	---	1	---	1	0
Barn Swallow	---	---	---	1	1	0
Black-chinned Hummingbird	---	---	---	1	1	0
Turkey Vulture	---	---	---	1	1	0
White-throated Swift	---	---	---	1	1	0
<i>Unidentified Bird</i>	13	9	---	6	28	1
<i>Unidentified Flicker</i>	7	---	---	---	7	0
<i>Unidentified Hummingbird</i>	2	---	---	5	7	0
<i>Unidentified Woodpecker</i>	2	4	---	---	6	0
<i>Unidentified Sparrow</i>	2	---	---	---	2	0
<i>Unidentified Vireo</i>	1	---	---	---	1	0
<i>Unidentified Empidonax</i>	---	---	---	1	1	0
<i>Unidentified Warbler</i>	---	---	---	1	1	0
Total	1,060	375	238	281	1,954	100

Note: New species that have not previously been verified for the park are shown in bold and shaded. Species are listed in rank order of detection, from the most to least commonly observed. Relative detectability among species has not been taken into account; thus, rank order provides only a general indication of relative abundance. Detectability will be explicitly accounted for in periodic synthesis reports. Because of the potential to confound future comparisons, these values exclude observations of species flying overhead/not using the habitat. Species noted as incidental were identified by our birding team, but not as part of our regular survey.

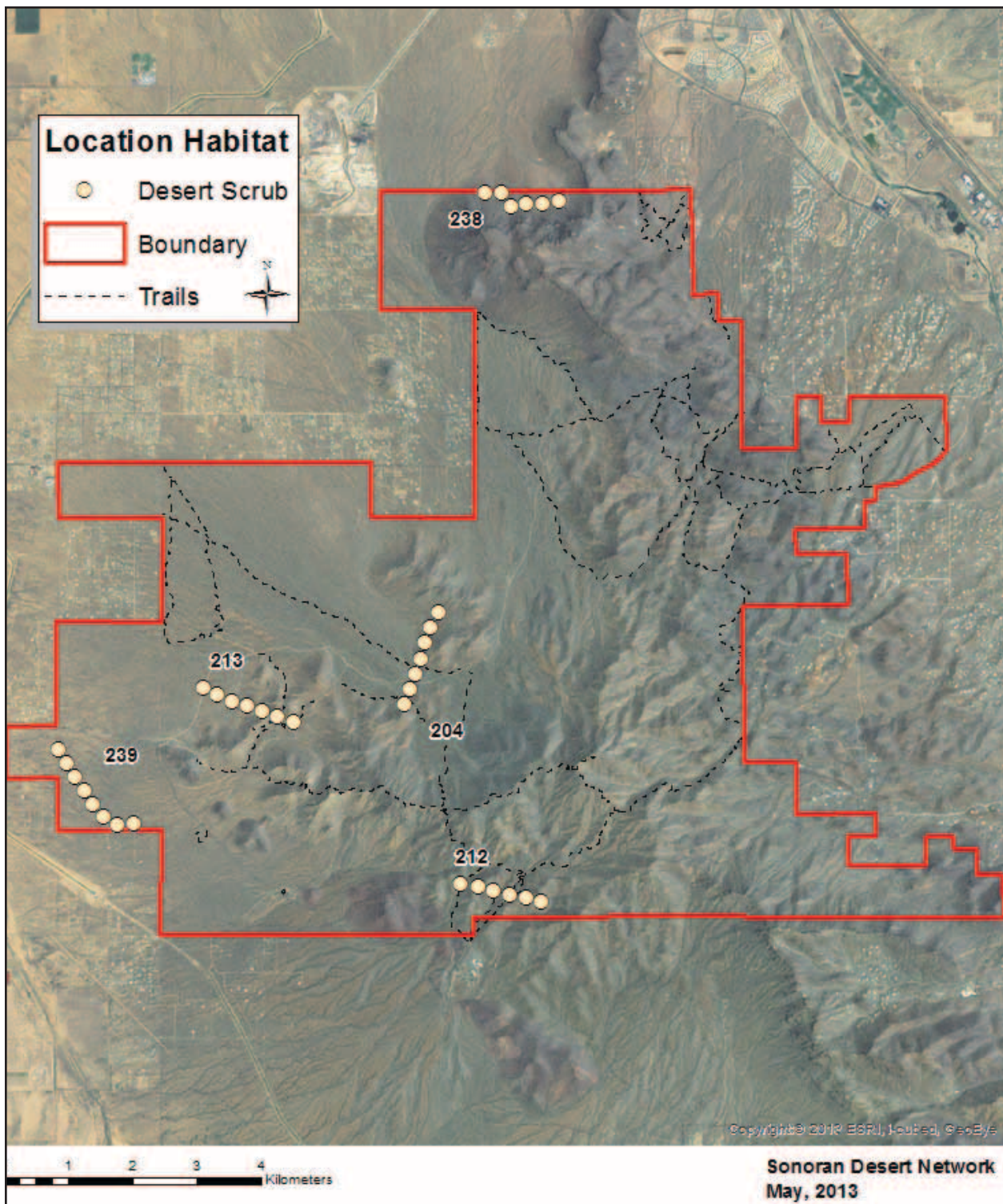


Figure 3.8.1-2. Point locations targeted for annual sampling at Saguaro NP, Tucson Mountain District (SAGW).

Table 3.8.2-2. Number of birds counted of each species in desert scrub habitat, Saguaro NP–Tucson Mountain District (SAGW), 2012

Species	# of birds counted		Species	# of birds counted	
	Total (desert scrub habitat)	% of total		Total (desert scrub habitat)	% of total
Gila Woodpecker	225	18	Canyon Wren	1	0
Cactus Wren	116	9	Gray Flycatcher	1	0
Gambel's Quail	95	8	Great-tailed Grackle	1	0
Curve-billed Thrasher	82	7	House Wren	1	0
Mourning Dove	78	6	Peregrine Falcon	1	0
White-winged Dove	67	5	Say's Phoebe	1	0
Ash-throated Flycatcher	52	4	<i>Unidentified Flicker</i>	17	1
House Finch	52	4	<i>Unidentified Bird</i>	9	1
Verdin	48	4	<i>Unidentified Flycatcher</i>	5	0
Pyrrhuloxia	47	4	<i>Unidentified Hummingbird</i>	4	0
Black-throated Sparrow	46	4	<i>Unidentified Woodpecker</i>	2	0
White-throated Swift	40	3	<i>Unidentified Sparrow</i>	1	0
Gilded Flicker	28	2	Total	1,224	100%
Black-tailed Gnatcatcher	25	2	<i>Note: New species that have not previously been verified for the park are shown in bold and shaded. Species are listed in rank order of detection, from the most to least commonly observed. Relative detectability among species has not been taken into account; thus, rank order provides only a general indication of relative abundance. Detectability will be explicitly accounted for in periodic synthesis reports. Because of the potential to confound future comparisons, these values exclude observations of species flying overhead/not using the habitat.</i>		
Brewer's Sparrow	20	2			
Canyon Towhee	20	2			
Rock Wren	17	1			
Ladder-backed Woodpecker	13	1			
Common Raven	12	1			
Green-tailed Towhee	10	1			
White-crowned Sparrow	10	1			
Scott's Oriole	9	1			
Costa's Hummingbird	8	1			
Rufous-winged Sparrow	8	1			
Lesser Goldfinch	6	0			
Turkey Vulture	6	0			
Yellow-rumped Warbler	6	0			
Harris's Hawk	5	0			
Brown-headed Cowbird	4	0			
Eurasian Collared-Dove	4	0			
Great Horned Owl	3	0			
Lark Sparrow	3	0			
Lucy's Warbler	3	0			
Red-tailed Hawk	3	0			
Gray Vireo	2	0			
Northern Mockingbird	2	0			
Rufous-crowned Sparrow	2	0			
Abert's Towhee	1	0			
Black-chinned Hummingbird	1	0			
Blue-gray Gnatcatcher	1	0			

3.9 Tonto National Monument

3.9.1 2012 sampling

During April 2012, we sampled two transects or grids at Tonto NM (Figure 3.9.1). One transect was in riparian habitat with eight points (Table 3.9.1), and the other was in upland (desert scrub) habitat with nine points. Each point was surveyed twice for a total of 34 point counts at Tonto NM.

3.9.2 Results and discussion

During 2012, 644 birds of 50 species were counted at Tonto NM (Table 3.9.2). White-crowned Sparrow had the highest number of individuals counted (10% of the total number of birds counted). Gambel's Quail (8%), Black-throated Sparrow (8%), Cactus Wren (5%), Northern Mockingbird (5%), Bell's Vireo (5%), and Gila Woodpecker (4%) were also counted in relatively high numbers. No new species were detected in 2012.

The following discussion is based on observations of the field crew and includes information of interest to the park that is not restricted to data collected during surveys.

The riparian transect and the small section of lush vegetation and flowing creek was the main draw

for migrants, with Western Tanager, Black-headed Grosbeak, Lazuli Bunting, Wilson's Warbler and Warbling Vireo present. The Cooper's Hawk pair was in attendance at the same nest site from last year, and Bell's Vireo, Black-chinned Hummingbird, Lesser Goldfinch, and Lucy's Warbler were most common in the riparian zone. On the upland desert transect, White-winged Dove, Ash-throated Flycatcher, Gila Woodpecker, Curve-billed Thrasher, Gambel's Quail, Northern Mockingbird, and Black-throated Sparrow were present in relatively high numbers, as was the Turkey Vulture roost and breeding colony of White-throated Swifts on the cliff dwellings. Pyrrhuloxia was again detected, and is quite unusual this far north, and territorial Gray Vireo and Indigo Bunting were seen in suitable nesting habitat.

From the northern park boundary, Roosevelt Lake and its shoreline are visible from both transects. Species dependent on the lake are occasionally observed over the distance and are also seen off-transect as incidentals at the northernmost section of the park. These include some species that are already on the park list, such as American White Pelican, Bald Eagle, Double-crested Cormorant, Great Blue Heron, Mallard, and Osprey, and some species which would be new for the park, such as Clark's Grebe, Western Grebe, Great Egret, Snowy Egret, American Coot, Killdeer, Ring-billed Gull and Franklin's Gull.

Table 3.9.1. Habitat type, number of points, and sampling dates for each transect or grid, Tonto NM, 2012

Transect/Grid	Habitat class	Habitat type	# points	# visits	Visit 1	Visit 2
RIP	Riparian	Riparian	8	2	4/12/2012	4/13/2012
UpW	Upland	Desert scrub	9	2	4/12/2012	4/13/2012



DAVE MENKE, USFWS

One Loggerhead Shrike (*Lanius ludovicianus*) was observed in desert scrub habitat at the National Monument in 2012.

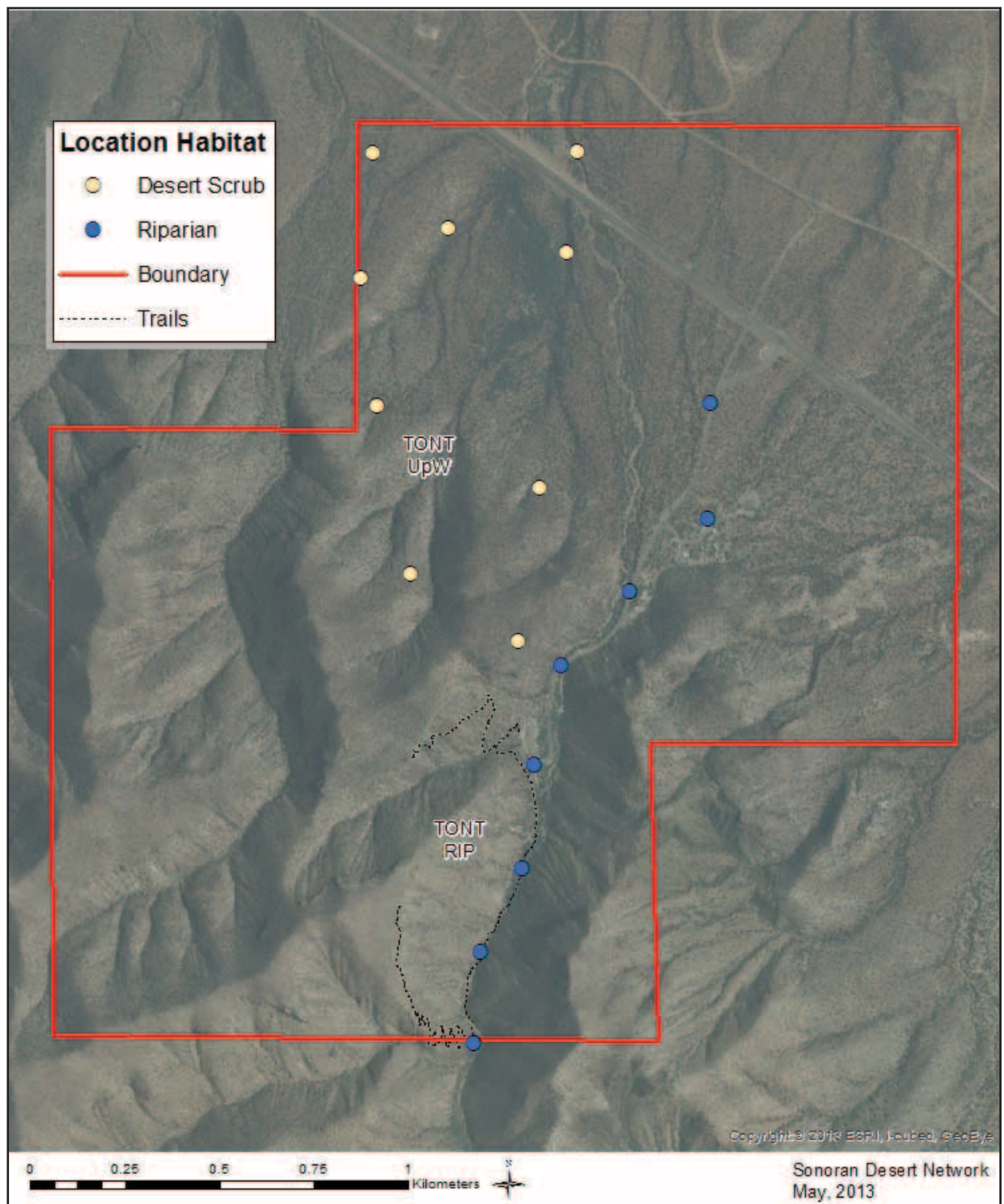


Figure 3.9.1. Point locations targeted for annual sampling at Tonto NM.

Table 3.9.2. Number of birds counted of each species in each habitat type, Tonto NM, 2012

Species	Habitat type		# of birds counted	
	Desert scrub	Riparian	Total	% of total
White-crowned Sparrow	44	18	62	10
Gambel's Quail	30	21	51	8
Black-throated Sparrow	34	16	50	8
Cactus Wren	11	20	31	5
Northern Mockingbird	23	7	30	5
Bell's Vireo	12	18	30	5
Gila Woodpecker	12	14	26	4
Turkey Vulture	20	3	23	4
Northern Cardinal	7	16	23	4
Northern Rough-winged Swallow	22	---	22	3
White-winged Dove	13	6	19	3
Phainopepla	9	10	19	3
Mourning Dove	10	8	18	3
Canyon Towhee	5	12	17	3
Verdin	8	7	15	2
House Finch	5	9	14	2
Lucy's Warbler	4	10	14	2
Black-tailed Gnatcatcher	8	3	11	2
Blue-gray Gnatcatcher	5	6	11	2
Rock Wren	4	7	11	2
Ash-throated Flycatcher	3	8	11	2
Canyon Wren	1	9	10	2
Lesser Goldfinch	1	9	10	2
Green-tailed Towhee	8	1	9	1
Curve-billed Thrasher	4	5	9	1
Say's Phoebe	3	6	9	1
Hooded Oriole	2	7	9	1
Violet-green Swallow	7	1	8	1
Rufous-crowned Sparrow	4	4	8	1
Bewick's Wren	4	2	6	1
Scott's Oriole	5	---	5	1
Costa's Hummingbird	---	5	5	1
Crissal Thrasher	4	---	4	1
Common Raven	2	2	4	1
Gilded Flicker	2	2	4	1
Anna's Hummingbird	---	4	4	1
Abert's Towhee	2	1	3	0
Brewer's Sparrow	---	3	3	0
Cooper's Hawk	---	3	3	0
Ladder-backed Woodpecker	2	---	2	0

Table 3.9.2. Number of birds counted of each species in each habitat type, Tonto NM, 2012, cont.

Species	Habitat type		# of birds counted	
	Desert scrub	Riparian	Total	% of total
Yellow-rumped Warbler	2	---	2	0
American Kestrel	1	1	2	0
Gray Vireo	1	1	2	0
Western Scrub-Jay	---	2	2	0
Bullock's Oriole	1	---	1	0
Loggerhead Shrike	1	---	1	0
Black-chinned Hummingbird	---	1	1	0
Broad-tailed Hummingbird	---	1	1	0
Gray Flycatcher	---	1	1	0
Virginia's Warbler	---	1	1	0
Unidentified Cormorant	3	---	3	0
Unidentified Hummingbird	2	---	2	0
Unidentified Bird	1	---	1	0
Unidentified Flicker	1	---	1	0
Total	353	291	644	100%

Note: New species that have not previously been verified for the park are shown in bold and shaded. Species are listed in rank order of detection, from the most to least commonly observed. Relative detectability among species has not been taken into account; thus, rank order provides only a general indication of relative abundance. Detectability will be explicitly accounted for in periodic synthesis reports. Because of the potential to confound future comparisons, these values exclude observations of species flying overhead/not using the habitat. Species noted as incidental were identified by our birding team, but not as part of our regular survey.

3.10 Tumacácori National Historical Park

3.10.1 2012 sampling

During April and May of 2012, we sampled two transects or grids at Tumacácori NHP (Figure 3.10.1). Both transects, with seven points each, were in riparian habitat (Table 3.10.1). Each point was surveyed twice, for a total of 28 point counts at the park in 2012.

3.10.2 Results and discussion

During 2012, 765 birds of 75 species were counted at Tumacácori NHP (Table 3.10.2). Gila Woodpecker had the highest number of individuals counted (7% of the total number of birds counted). Other species counted in relatively high numbers included Lucy's Warbler (6%), White-winged Dove (6%), Lesser Goldfinch (4%), Brown-crested Flycatcher (4%), Mourning Dove (4%), and Bewick's Wren (4%). Three new species, Belted Kingfisher, Northern Harrier, and Spotted Towhee, were recorded for the park in 2012 during surveys. A Short-tailed Hawk, an incidental observation, was also recorded for the first time.

The following discussion is based on observations of the field crew and includes information of interest to the park that is not restricted to data collected during surveys.

Riparian summer breeders like Summer Tanager, Yellow Warbler, Bell's Vireo, White-winged Dove, Yellow-breasted Chat, Cassin's Kingbird, Broad-billed Hummingbird, and Brown-crested Flycatcher were quite numerous, and resident Song Sparrow, Bewick's Wren, Lesser Goldfinch, Abert's Towhee, Gila Woodpecker, and Mourning Dove were present in good numbers. The regeneration of the gallery forest on the east bank transect since the 2009 fire has been impressive; the undergrowth is lush and dense and the canopy is filling in. Migrants were numerous and included Western Tanager, Black-headed Grosbeak, Plumbeous Vireo, Swainson's Thrush, Lazuli Bunting, American Robin, and Pacific-slope Flycatcher, to name a few. Three pairs of Gray Hawks were observed nesting at last year's sites, Tropical Kingbird and Thick-billed Kingbird were seen where they have bred in recent years, and Vaux's Swift and Common Black-Hawk were noted as migrants.

The park and its adjacent riparian sections of the flowing Santa Cruz River are a major birding hotspot for local birders and the area is heavily birded, resulting in interesting and unusual sightings all year round. Some highlights from the park and nearby habitats (incidental observations) included Streak-backed Oriole, Eastern Phoebe, Rufous-backed Robin, Black-and-White Warbler, Swamp Sparrow, and White-throated Sparrow.

Table 3.10.1. Habitat type, number of points, and sampling dates for each transect or grid, Tumacácori NHP, 2012

Transect/Grid	Habitat class	Habitat type	# points	# visits	Visit 1	Visit 2
Est	Riparian	Riparian	7	2	4/11/2012	5/15/2012
Wst	Riparian	Riparian	7	2	4/11/2012	5/15/2012

Northern Harrier (*Circus cyaneus*) was detected at the park for the first time in 2012.



ROB BENNETTS

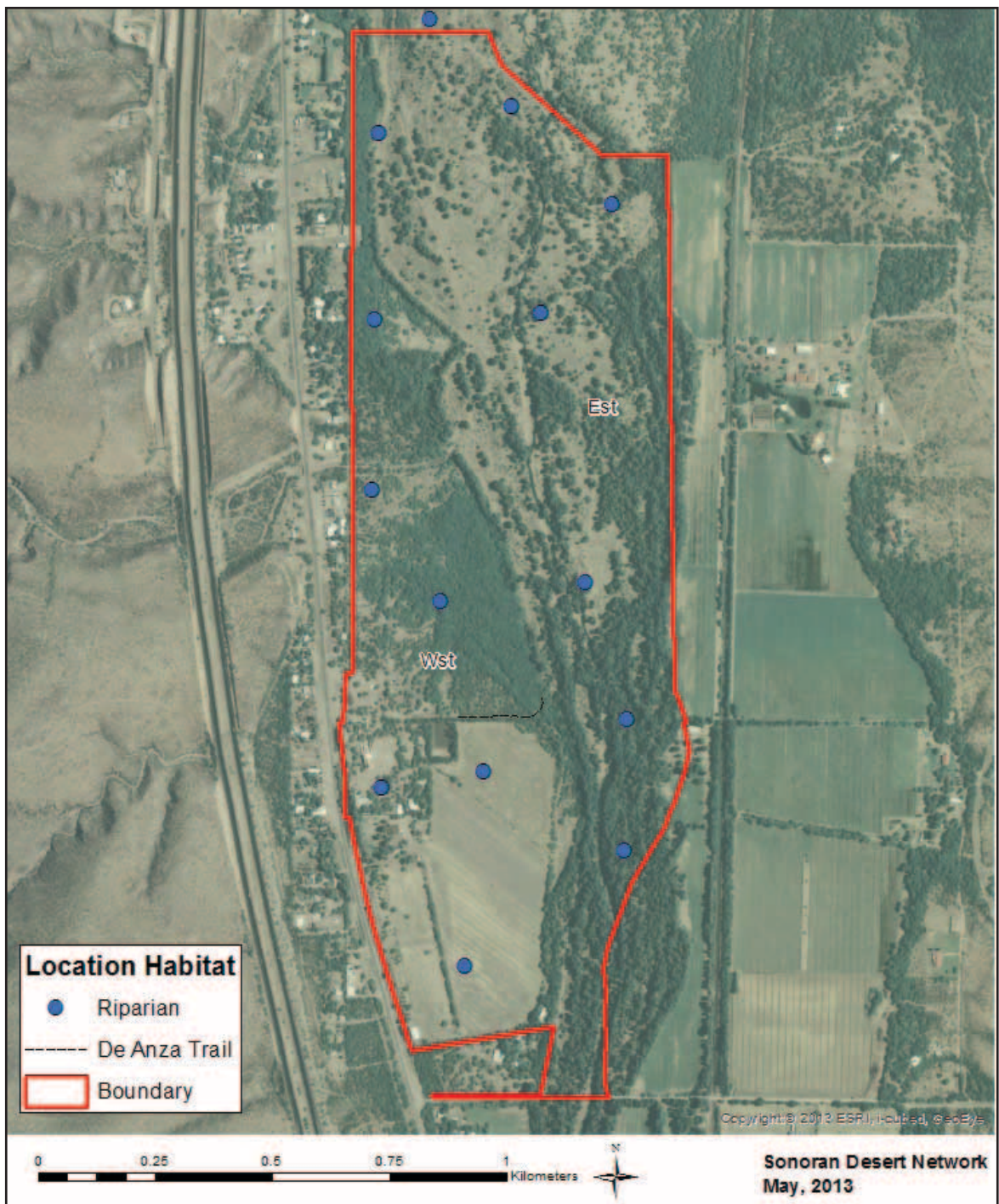


Figure 3.10.1. Point locations targeted for annual sampling at Tumacacori NHP.

Table 3.10.2. Number of birds counted of each species in riparian habitat, Tumacácori NHP, 2012

Species	# of birds counted		Species	# of birds counted	
	Total (riparian habitat)	% of total		Total (riparian habitat)	% of total
Gila Woodpecker	51	7	Anna's Hummingbird	4	1
Lucy's Warbler	49	6	Cedar Waxwing	4	1
White-winged Dove	46	6	Northern Beardless-Tyrannulet	4	1
Lesser Goldfinch	34	4	Savannah Sparrow	4	1
Brown-crested Flycatcher	33	4	Tropical Kingbird	4	1
Mourning Dove	32	4	Common Yellowthroat	3	0
Bewick's Wren	30	4	Green-tailed Towhee	3	0
Cassin's Kingbird	23	3	Northern Rough-winged Swallow	3	0
House Finch	22	3	Rufous-winged Sparrow	3	0
Vermilion Flycatcher	21	3	Tree Swallow	3	0
Northern Cardinal	20	3	Vaux's Swift	3	0
Phainopepla	18	2	Blue Grosbeak	2	0
Yellow-rumped Warbler	18	2	European Starling	2	0
Broad-billed Hummingbird	17	2	Hooded Oriole	2	0
Turkey Vulture	17	2	Lazuli Bunting	2	0
Yellow Warbler	17	2	Ruby-crowned Kinglet	2	0
Bridled Titmouse	16	2	Say's Phoebe	2	0
Bell's Vireo	14	2	Spotted Towhee	2	0
Brown-headed Cowbird	13	2	Western Tanager	2	0
House Sparrow	13	2	Wilson's Warbler	2	0
Verdin	13	2	Zone-tailed Hawk	2	0
Abert's Towhee	12	2	Belted Kingfisher	1	0
Dusky-capped Flycatcher	12	2	Black-chinned Hummingbird	1	0
Summer Tanager	12	2	Blue-gray Gnatcatcher	1	0
Ash-throated Flycatcher	11	1	Cassin's Sparrow	1	0
Gray Hawk	11	1	Cliff Swallow	1	0
Song Sparrow	11	1	Curve-billed Thrasher	1	0
Black-headed Grosbeak	9	1	Gilded Flicker	1	0
Bullock's Oriole	9	1	Indigo Bunting	1	0
Yellow-breasted Chat	9	1	Northern Harrier	1	0
Ladder-backed Woodpecker	8	1	Plumbeous Vireo	1	0
Common Raven	7	1	Pyrrhuloxia	1	0
Lark Sparrow	7	1	Red-tailed Hawk	1	0
Western Kingbird	7	1	Thick-billed Kingbird	1	0
White-crowned Sparrow	7	1	Short-tailed Hawk (incidental)	---	---
Barn Swallow	6	1	Western Meadowlark	1	0
Chipping Sparrow	5	1	<i>Unidentified Bird</i>	5	1
Gambel's Quail	5	1	<i>Unidentified Flycatcher</i>	3	0
Gray Flycatcher	5	1	<i>Unidentified Myiarchus</i>	3	0
Warbling Vireo	5	1	<i>Unidentified Kingbird</i>	2	0

Table 3.10.2. Number of birds counted of each species in riparian habitat, Tumacácori NHP, 2012, cont.

Species	# of birds counted	
	Total (riparian habitat)	% of total
<i>Unidentified Raptor</i>	2	0
<i>Unidentified Empidonax</i>	1	0
<i>Unidentified Hummingbird</i>	1	0
<i>Unidentified Woodpecker</i>	1	0
Total	765	100%

Note: New species that have not previously been verified for the park are shown in bold and shaded. Species are listed in rank order of detection, from the most to least commonly observed. Relative detectability among species has not been taken into account; thus, rank order provides only a general indication of relative abundance. Detectability will be explicitly accounted for in periodic synthesis reports. Because of the potential to confound future comparisons, these values exclude observations of species flying overhead/not using the habitat. Species noted as incidental were identified by our birding team, but not as part of our regular survey.



Black-headed Grosbeak (*Pheucticus melanocephalus*) was observed at Tumacácori NHP, as well as seven other park units, in 2012.

3.11 Tuzigoot National Monument

3.11.1 2012 sampling

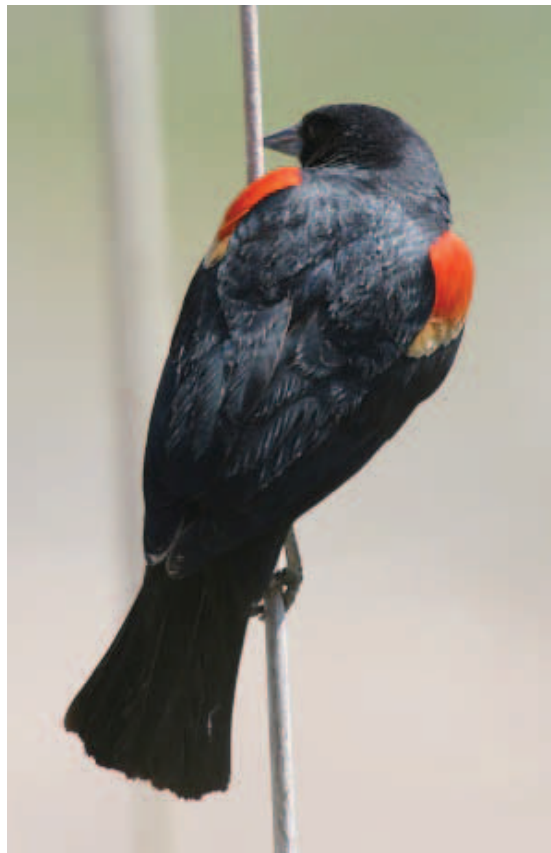
During May 2012, we sampled two transects or grids at Tuzigoot NM (Figure 3.11.1). One transect was in riparian habitat with seven points (Table 3.11.1), and the other was in upland (desert scrub) habitat with seven points. Each point was surveyed twice for a total of 28 point counts at the NM.

3.11.2 Results and discussion

During 2012, 679 birds of 57 species were counted at Tuzigoot NM (Table 3.11.2). Phainopepla had the highest number of individuals counted (12% of the total number of birds counted). Other species counted in relatively high numbers included Red-winged Blackbird (10%), Mourning Dove (9%), House Finch (5%), Northern Rough-winged Swallow (5%), and Common Yellowthroat (5%). No new species were recorded in 2012.

The following discussion is based on observations of the field crew and includes information of interest to the park that is not restricted to data collected during surveys.

The riparian transect once again had the most diversity and birds counted with the large breeding population of Red-winged Blackbirds and wetland species such as Common Yellowthroat, Great Blue Heron, Sora, Green Heron, Double-crested Cormorant, and Black-crowned Night-Heron, coupled with a nice assortment of riparian species (such as Yellow Warbler, Summer Tanager, Bell's Vireo, and Yellow-breasted Chat). The upland transect had Phainopepla, Lucy's Warbler, House Finch, Western Kingbird, Black-



© ROBERT SHANTZ

Red-winged Blackbird (*Dendroica petechia*) was a common species at Tuzigoot NM in 2012.

chinned Hummingbird, Mourning Dove, and Northern Mockingbird. Common Black-Hawk, Mallard, Common Merganser, and Wood Duck were also seen, and Red-tailed Hawk, Violet-green Swallow, and Great Horned Owl were noted breeding. The feeders at the staff housing, visible from the upland transect, attracted hummingbirds, orioles, tanagers, blackbirds, finches, doves, and sparrows.

Table 3.11.1. Habitat type, number of points, and sampling dates for each transect or grid, Tuzigoot NM, 2012

Transect/Grid	Habitat class	Habitat type	# points	# visits	Visit 1	Visit 2
Est	Riparian	Riparian	7	2	5/19/2012	5/31/2012
Wst	Upland	Desert Scrub	7	2	5/19/2012	5/30/2012



Figure 3.11.1. Point locations targeted for annual sampling at Tuzigoot NM.

Table 3.11.2. Number of birds counted of each species in each habitat type, Tuzigoot NM, 2012

Species	Habitat type		# of birds counted	
	Desert scrub	Riparian	Total	% of total
Phainopepla	39	40	79	12
Red-winged Blackbird	26	41	67	10
Mourning Dove	28	30	58	9
House Finch	25	10	35	5
Northern Rough-winged Swallow	12	22	34	5
Common Yellowthroat	10	21	31	5
Gila Woodpecker	11	19	30	4
Yellow-breasted Chat	6	21	27	4
Brown-crested Flycatcher	4	19	23	3
Blue Grosbeak	11	9	20	3
Song Sparrow	3	16	19	3
Northern Mockingbird	15	3	18	3
Lucy's Warbler	7	11	18	3
Gambel's Quail	14	2	16	2
Brown-headed Cowbird	9	5	14	2
Bullock's Oriole	8	5	13	2
Yellow Warbler	5	8	13	2
Summer Tanager	2	11	13	2
Cassin's Kingbird	11	1	12	2
Northern Cardinal	1	11	12	2
Ash-throated Flycatcher	5	5	10	1
Black-chinned Hummingbird	4	4	8	1
Bewick's Wren	---	8	8	1
Lesser Goldfinch	5	2	7	1
Wilson's Warbler	4	3	7	1
Verdin	3	4	7	1
Common Raven	2	5	7	1
Ladder-backed Woodpecker	2	5	7	1
Great-tailed Grackle	2	4	6	1
Western Kingbird	4	1	5	1
Abert's Towhee	2	2	4	1
Warbling Vireo	---	4	4	1
Marsh Wren	3	---	3	0
Bank Swallow	---	3	3	0
Black-throated Sparrow	2	---	2	0
Say's Phoebe	2	---	2	0
Great Blue Heron	1	1	2	0
Green Heron	1	1	2	0
Mallard	1	1	2	0
Northern Flicker	1	1	2	0

Table 3.11.2. Number of birds counted of each species in each habitat type, Tuzigoot NM, 2012, cont.

Species	Habitat type		# of birds counted	
	Desert scrub	Riparian	Total	% of total
Virginia Rail	1	1	2	0
Black-crowned Night-Heron	---	2	2	0
Western Tanager	---	2	2	0
American Kestrel	1	---	1	0
Blue-gray Gnatcatcher	1	---	1	0
Broad-tailed Hummingbird	1	---	1	0
Hooded Oriole	1	---	1	0
Red-tailed Hawk	1	---	1	0
Vermilion Flycatcher	1	---	1	0
American Coot	---	1	1	0
Double-crested Cormorant	---	1	1	0
Eurasian Collared-Dove	---	1	1	0
Great Horned Owl	---	1	1	0
Lazuli Bunting	---	1	1	0
Violet-green Swallow	---	1	1	0
Western Scrub-Jay	---	1	1	0
Western Wood-Pewee	---	1	1	0
<i>Unknown Bird</i>	7	---	7	1
<i>Unknown Sparrow</i>	2	---	2	0
Total	307	372	679	100%

Note: New species that have not previously been verified for the park are shown in bold and shaded. Species are listed in rank order of detection, from the most to least commonly observed. Relative detectability among species has not been taken into account; thus, rank order provides only a general indication of relative abundance. Detectability will be explicitly accounted for in periodic synthesis reports. Because of the potential to confound future comparisons, these values exclude observations of species flying overhead/not using the habitat. Species noted as incidental were identified by our birding team, but not as part of our regular survey.

4 Literature Cited

- Alcock, J. 2005. *Animal behavior: An evolutionary approach*. Sunderland, Ma.: Sinauer Associates.
- Barrows, C. W., M. B. Swartz, W. L. Hodges, M. F. Allen, J. T. Rotenberry, B. L. Li, T. A. Scott, and X. W. Chen. 2005. A framework for monitoring multiple-species conservation plans. *Journal of Wildlife Management* 69:1333–1345.
- Bennetts, R.E., K. Gallo, D. Hanni, A. Hubbard, R. Lock, B.F. Powell, H. Sosinski, C. White, M. Wilson, P. Valentine-Darby, and K. Beaupré. 2013 (in review). Landbird monitoring protocol for the Chihuahuan Desert, Northern Great Plains, Sonoran Desert, and Southern Plains Networks. Version 1.00. Natural Resource Report NPS/SOPN/NRTR-2013/XXX. National Park Service, Fort Collins, Colorado.
- Bibby, C. J., N. D. Burgess, D. A. Hill, and S. Mustoe. 2000. *Bird census techniques*. Second ed. London: Academic Press.
- Bryce, S. A., R. M. Hughes, and P. R. Kaufmann. 2002. Development of a bird integrity index: Using bird assemblages as indicators of riparian condition. *Environmental Management* 30:294–310.
- Buckland, S. T., D. R. Anderson, K. P. Burnham, J. L. Laake, D. L. Borchers, and L. Thomas. 2001. *Introduction to distance sampling: Estimating abundance of biological populations*. Oxford, U.K.: Oxford University Press.
- Burnham, K. P., D. R. Anderson, and J. L. Laake. 1980. Estimation of density from line transect sampling of biological populations. *Wildlife Monographs*, no. 72.
- Canterbury, G. E., T. E. Martin, D. R. Petit, L. J. Petit, and D. F. Bradford. 2000. Bird communities and habitat as ecological indicators of forest condition in regional monitoring. *Conservation Biology* 14:544–558.
- Dale, V. H., and S. C. Beyeler. 2001. Challenges in the development and use of ecological indicators. *Ecological Indicators* 1:3–10.
- Diefenbach, D. R., D. W. Brauning, and J. A. Mattice. 2003. Variability in grassland bird counts related to observer differences and species detection rates. *Auk* 120:1168–1179.
- Field, S. A., A. J. Tyre, and H. P. Possingham. 2005. Optimizing allocation of monitoring effort under economic and observational constraints. *Journal of Wildlife Management* 69:473–482.
- Holmes, R. T., and T. W. Sherry. 2001. Thirty-year bird population trends in an unfragmented temperate deciduous forest: Importance of habitat change. *Auk* 118:589–609.
- Hutto, R. L. 1985. Habitat selection by non-breeding, migratory, land birds. Pages 455–476 in M. L. Cody, ed., *Habitat selection in birds*. Orlando, Fla.: Academic Press.
- Krueper, D., J. Bart, and T. D. Rich. 2003. Response of vegetation and breeding birds to the removal of cattle on the San Pedro River, Arizona (USA). *Conservation Biology* 17:607–615.
- MacKenzie, D. I., J. D. Nichols, J. A. Royle, K. H. Pollock, L. L. Bailey, and J. E. Hines. 2006. *Occupancy estimation and modeling: Inferring patterns and dynamics of species*. Burlington, Ma.: Elsevier Press.
- MacKenzie, D. I., J. D. Nichols, J. E. Hines, M. G. Knutson, and A. B. Franklin. 2003. Estimating site occupancy, colonization, and local extinction when a species is detected imperfectly. *Ecology* 84:2200–2207.
- Manley, P. N., W. J. Zielinski, M. D. Schlesinger, and S. R. Mori. 2004. Evaluation of a multiple-species approach to monitoring species at the ecoregional scale. *Ecological Applications* 14:296–310.
- National Park Service (NPS). 1992. *NPS-75: Natural resources inventory and monitoring guidelines*. U.S. Department of Interior, Washington, D.C.
- . 2005. *Sonoran Desert Network vital signs monitoring plan*. Technical Report NPS/IMR/SODN-003. National Park Service, Denver, Co.
- Powell, B. F., A. D. Flesch, T. Mau-Crimmins, D. Angell, K. Beaupre, and W. L. Halvorson. 2007. *Landbird monitoring protocol for the Sonoran Desert Network*. Version 1.02. Unpublished protocol to the National Park Service, Sonoran Desert Network Inventory and Monitoring Program, Tucson, Az.

- Reynolds, R. T., J. M. Scott, and R. A. Nussbaum. 1980. A variable circular-plot method for estimating bird numbers. *Condor* 82:309–313.
- Ringold, P. L., J. Alegria, R. L. Czaplewski, B. S. Mulder, T. Tolle, and K. Burnett. 1996. Adaptive monitoring design for ecosystem management. *Ecological Applications* 6:745–747.
- Sekercioglu, C. H. 2002. Impacts of birdwatching on human and avian communities. *Environmental Conservation* 29:282–289.
- Stevens, L. E., and B. D. Gold. 2003. Monitoring for adaptive management of the Colorado River Ecosystem in Glen and Grand canyons. Pages 101–134 in D. E. Busch and J. C. Trexler, eds., *Monitoring ecosystems: Interdisciplinary approaches for evaluating ecoregional initiatives*. Washington, D.C.: Island Press.
- Thomas, L., J. L. Laake, S. Strindberg, F. F. C. Marques, S. T. Buckland, D. L. Borchers, D. R. Anderson, K. P. Burnham, S. L. Pollard, J. H. Hedley, J. R. B. Bishop, and T. A. Marques. 2005. *Distance 5.0. Release Beta 5*. Research unit for wildlife population assessment, University of St. Andrews, U.K. <http://www.ruspa.st-and.ac.uk/distance>.
- Wiens, J. A. 1985. Habitat selection in variable environments: Shrub-steppe birds. Pages 191–226 in M. L. Cody, ed., *Habitat selection in birds*. Orlando, Fl.: Academic Press.

The Department of the Interior protects and manages the nation's natural resources and cultural heritage; provides scientific and other information about those resources; and honors its special responsibilities to American Indians, Alaska Natives, and affiliated Island Communities.

NPS 960/120865, May 2013

National Park Service
U.S. Department of the Interior



Natural Resource Stewardship and Science

1201 Oak Ridge Drive, Suite 150
Fort Collins, Colorado 80525

www.nature.nps.gov

EXPERIENCE YOUR AMERICA™